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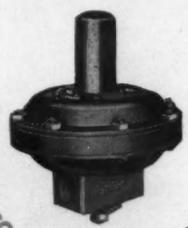
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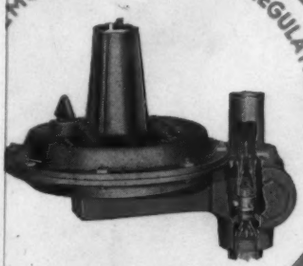
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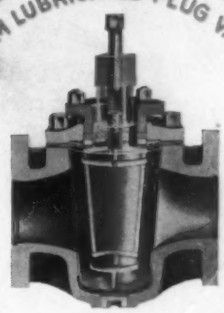
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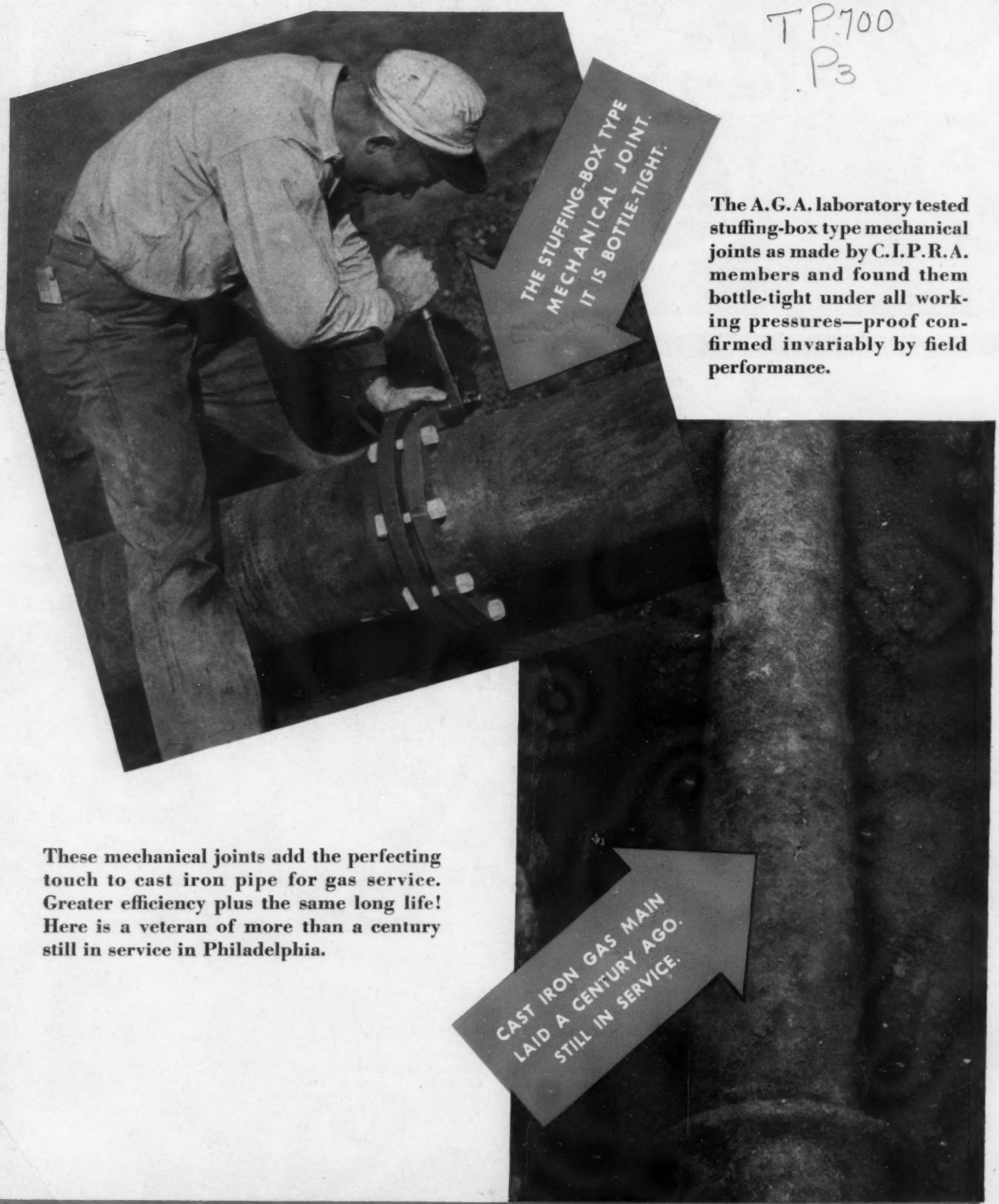

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These mechanical joints add the perfecting touch to cast iron pipe for gas service. Greater efficiency plus the same long life! Here is a veteran of more than a century still in service in Philadelphia.

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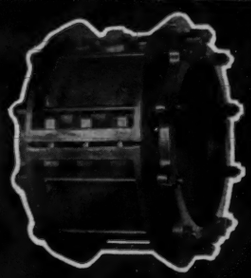
THE STANDARD MATERIAL FOR DISTRIBUTION MAINS

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago

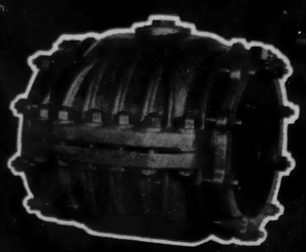
FOR *QUICK* REPAIRS
USE THESE SPLIT SLEEVES

When steel pipe or steel pipe joints break or leak, repair them quickly and *permanently* with a Dresser Split Sleeve and save time, trouble, and money. Such repairs can be made by ordinary labor—in most cases without interruption of the service. For emergency repairs, a Dresser Sleeve or two in stock may save hundreds of dollars. There's a Dresser Repair Sleeve for almost every type of leak. When ordering, specify outside diameter of pipe, operating line pressure, and kind of repair to be made. Rush orders are given special attention.



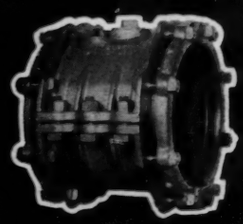
STYLE 52-A

This Split Sleeve will completely enclose and permanently repair *plain circumferential welds, screw collars, welded bell and spigot joints* and *double bell welded joints*. It will also cover splits or holes in the pipe up to 8" in length. Style 52-A is recommended for working pressures up to 500 lbs. per sq. in. and is available in all the standard steel pipe sizes from 4" I.D. to 26" O.D. inclusive. Write for further information.



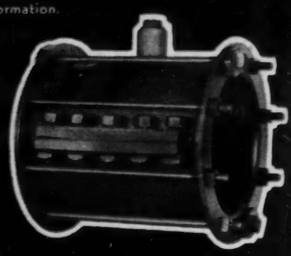
STYLE 54-A

The style 54-A has sufficient inside clearance to completely enclose and permanently repair *leaking joints of the bolted coupling type*. It is recommended for working pressures up to 500 lbs. per sq. in. Sleeves of this style are available in all standard steel pipe sizes from 2" I.D. to 26" O.D. inclusive. Write for further information.



STYLE 73

The purpose of this light, inexpensive Split Sleeve is to enclose and permanently repair *plain circumferential welded joints* and *screw collars*, as well as splits or holes in the pipe up to 8" in length. Two or more of these Sleeves can be joined together for larger breaks. Style 73 is recommended for working pressures up to 250 lbs. per sq. in. and is available in standard steel pipe sizes from 2" I.D. to 12" I.D. inclusive. Write for further information.



STYLES 12, 13, 50, 380 and 400

Above is illustrated a typical Dresser welded steel split sleeve of a type that is furnished when a *special pipe size* or *unusual enclosure* does not permit using Styles 52-A, 73, or 54-A. Welded steel split sleeves are built to order to meet the particular requirements of the repair. Detailed information should be furnished when ordering.

All illustrations made from actual unretouched photographs.

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WESTERN GAS

"Reg. U. S. Pat. Off."

Publication Office: 810 South Spring Street, Los Angeles, Calif.—Phone Michigan 1481
District Office: 1064 Peoples Gas Building, Chicago — Phone Harrison 8536

JAY JENKINS, Publisher GEORGE H. FINLEY, Editor CRAIG ESPY, Mid-Western Manager
ANATOL FOMILYANT, News Editor W. G. RUSSELL, Field Representative

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January, 1936. Volume XII, Number 1. WESTERN GAS is published monthly by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance), 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1897. Copyright, 1936.

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OFFICIAL PUBLICATION: Pacific Coast Gas Association; Southern California Meter Association

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Reproduction of the micrograph above shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.

For pipe of larger diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

A pipe line worth laying

is worth protecting against corrosion

You can defer reconditioning for many years with a waterproof, dielectric coating of enamel which keeps soil acids, moisture and electric currents away from the metal. The unique laminated structure of Barrett Pipe Line Enamels gives them greater resistance to soil stresses, makes them tougher and more flexible — promotes complete and lasting protection against corrosion. For detailed information, phone, write or wire.

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Plenty of *Rust-Free* Hot Water

when the Heater has a Tank of Non-Rust EVERDUR

Purchasers of automatic water heaters want rust-free hot water, and plenty of it... not for just a few years, but indefinitely. And only a tank that *cannot* rust will satisfy this requirement.

Everdur... the ideal metal for tanks... is nearly all copper, made as strong and tough as steel by a special alloying process. Yet it is immune to rust. Since it welds as readily as steel, Everdur makes possible the *economical* production of non-rust tanks by welding—the sturdiest type of construction employed by tank makers. In addition to its great strength and corrosion resistance, Everdur is highly ductile—a combination of properties which enables Everdur tanks to undergo successfully the most drastic tests.

And Everdur tanks are time-tried. Thousands of them... ranging in size from one to 20,000 gallons capacity... are in various types of service. Leading makers of automatic gas water heaters standardize on Everdur for rust-proof models. This quality equipment, by providing rust-free, trouble-free service, offers the public long life at low cost.

ANACONDA
from mine to consumer

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EVERDUR METAL *for* TANKS

RUSTLESS AS COPPER... STRONG AS STEEL

WESTERN GAS
JANUARY, 1936

Guest Editorial

CLIMB DOWN FROM THE MOUNTAIN TOP!

By P. M. DOWNING
Vice-President and General Manager
Pacific Gas and Electric Company

WHATEVER the force or the circumstances that put them there, the gas and electric utilities as a group find themselves on a high peak of isolation that is more uncomfortable than splendid.

In the welter of national and local discussion of utility problems, practices and policies, and during the succession of aggressions against the service companies, it has become the political habit to regard the utilities, first the electric companies and lately the gas also, as being quite apart from the rest of the economic and social world.

The strategy of this course is apparent. Adverse public opinion is easier to build up when the gas and electric companies are dissociated from the public interest. Consciously or not, the effort seems to have been to lead the people to forget or ignore the undeniable fact that few if any businesses are so tightly interlaced as the utilities with human welfare and progress.

We have helped isolate ourselves, frequently, by a proneness to believe that our responsibility ends with good service and fair rates. We have kept ourselves remote from the people, too often, by our defensive attitude and our conviction that the technical complexities of utility management are beyond popular comprehension.

Something can be done to correct this situation. We, ourselves, can better our position, if we will. We can climb down from the mountain top by more readily admitting and assuming our public responsibilities; by asserting a more militant citizenship in all worthy movements; by mixing a little more "of the people and for the people" with our philosophy of utility administration. We must recognize our social responsibility, along with our obligations to customers and stockholders.

For example, can anyone reasonably question the right of the utility companies to participate, within proper limits, in the affairs of government on the same basis as any other group of citizens? Such participation would appear to be a duty rather than merely a right.

Legislation that affects the utilities, rebounds for or against the interests of millions of stockholders, millions of consumers of gas and electricity, hundreds of thousands of employees. Expenditures of government, local and national, are distinctly our concern, since taxes are assessed against us to pay a heavy share of those expenditures.

My company has just completed payment of the first installment of taxes levied upon its properties by city and county and district governments under a new California law which transferred utility taxes from the State to local subdivisions. Our total bill for the current tax year will be in excess of $7,000,000. The Company is the largest taxpayer in 28 counties of the northern part of the State. It is, to this great extent, the trustee of the public interest in its attitude toward community and governmental affairs.

The gas and electric companies need not be stampeded by the present official hullaballoo against their interesting themselves in legislation. The protests come chiefly from those who want to keep us on the mountain top for their own purposes. We cannot be kept there if we refuse to be isolated, if we fight ignorance with frank and full information, if we combat prejudice with enlightened citizenship.

To remain alone is to invite disaster.

MODERN METHODS in industrial gas measurement

Base Pressure and Base Volume Indexes take mathematics out of customer relations . . . eliminating the need for chart calculations to determine billing data.

The modern installation of the Atlanta Gas Light Company illustrated gives the customer at all times a complete knowledge of fuel consumed.

These five 500B Ironcase Meters provide a capacity of 75,000 cubic feet an hour, and are the last word in safeguarding customer satisfaction with the use of gas fuel. Their one-piece body castings eliminate internal leakages; equipped with complete Alemite lubrication systems, and dust protection for the bearings, Ironcase Meters likewise insure a much longer period of accuracy and low cost operation.

These modern installations all over the world are adding to the value of industrial gas service.

If you do not have a copy of Bulletin EG40 it will be mailed you promptly on request.

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AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK, N. Y.

January, 1936

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. XII, No. 1

LOS ANGELES—810 South Spring Street . . . . . 1064 Peoples Gas Building—CHICAGO

Mixed Outlook for Utilities

UTILITIES enter 1936 with a reasonable expectation of continued improvement in their business, as measured in volume of services supplied their customers. By other standards, such as the outlook for freedom from political harassment, the forecast cannot be made with so much certainty.

As this is written, the industry's largest holding companies and government legal talent are jockeying for position in introducing the Utility Act of 1935 to court test. While the administration would like to lay down the exact lines along which its own forced legislation shall be tried, the holding companies are standing firm on their right to have the law tested broadly, though they are perfectly willing to narrow down the number of trial cases to a practicable few. With Congress again in session some utility leaders voice a hope for modification of the holding company law to remove destructive features, and make it truly regulatory.

Also in the making is a Supreme Court decision on the government's TVA power program, destined to be far-reaching in influence on the future course of government competition with private industry in the arena of utility services.

Thus, from some points of view the outlook is unsettled, but previous court reversals of New Deal measures support the general feeling that the utility cause is at last about to be heard fully and fairly. Together with the pickup in business volume, this factor sends the industry into the new year with hope and confidence.

Statistically, the gas industry continued its 1934 gains last year. The customer total rose to above 16 million, for a new all-time high mark. Revenues also grew—7.8 per cent increase for natural gas, .5 per cent decrease for manufactured—an overall increase of 3.4 per cent. Cubic foot sales were up 7.6 per cent for the industry as a whole.

Industry Promotion in 1936

GAS COMPANIES on the west coast, through the Pacific Coast Gas Association, have just launched their eighth annual program of cooperative advertising. This continuous campaign is proving an effective tool for keeping modern gas service before specific industries, as well as the general public. Its domestic phase, discontinued during the depression, was renewed last year on a modified basis and in 1936 will be a strong element of the plan, with consumer magazine media being used regularly.

Continued support given this regional cooperative advertising project shows real vision on the part of the company managements responsible for it. Not only has the west coast campaign been maintained without a break, but initiative and support for the proposed national campaign has been supplied by the same managements. In these competitive times gas should be advertised on every front—national, regional and local—more intensively than ever before.

Progress is being made with getting endorsement for the three-year national campaign. Late in December pledges were in hand representing something over 5 million meters, nearly 50 per cent of the quota (70 per cent of all meters) which must be reached before the campaign can get under way. There should be no let-up in the drive to make this campaign a reality early in 1936.

Basis for Larger Sales Budgets

CUSTOM has it that before the first of a new year sales executives go to company managements with next year's budget, based on the amount of new annual revenue which the coming sales program is expected to produce.

One sales manager suggests to *Western Gas* that a change be made in this time-honored budget procedure. Says this executive, budgets should recognize in some measure the total revenue which will accrue from an appliance, over its entire life, rather than merely the first year. Where a consumer is switched from a competitive fuel to gas, and installs appliances which represent new load, this view has particular merit.

★ ★

NEXT MONTH

Wastage Continues in Texas

Last year's Texas legislation, enacted to curb natural gas waste, thus far has proved fruitless. This article, which goes deeply into the background of the Panhandle wastage situation, is full of valuable reference information on history of the world's largest gas field.

Bargain Rates for Gas

Describing a low cost rate plan and a method for introducing it without prejudicing revenue levels.

Laying Lines Under Highways

Pipe pushing procedure and special equipment for the operation are discussed in this feature, as particularly applied to laying mains under highways in metropolitan areas.

Reentering an Appliance Market

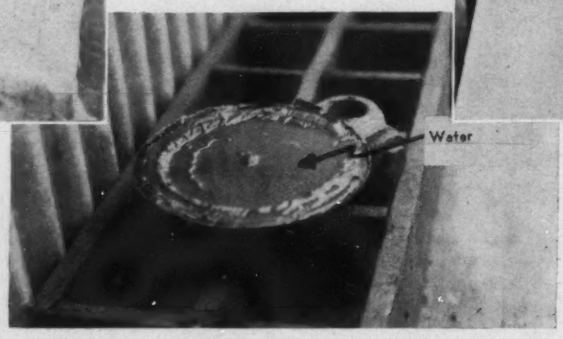
Is gas company sales leadership necessary? This article describes the experience of a company which withdrew from a market, then returned to direct selling with the endorsement of its dealers.

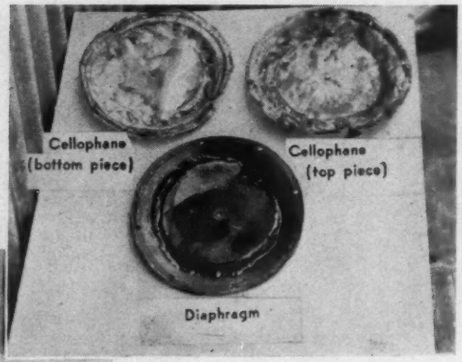
New Measurement Procedure

A symposium on new record forms and procedures introduced by west coast companies for developing orifice meter coefficients.

ABOVE:
New diaphragm and layer of Cellophane, before bolting on regulator top.

BELOW:
Regulator with top removed. Entire top of diaphragm (Cellophane-protected) is covered with water, but leather is in perfect condition after over two years of service.





ABOVE:
Diaphragm and Cellophane removed from regulator shown in center view.

CELLOPHANE PROTECTION for Service Regulator Diaphragms

By ROBERT M. HUTCHISON
Chief Engineer, Houston Natural Gas Company

ABOUT two years ago when leakage surveys were being conducted on the Houston Natural Gas Co. system some of the losses were found to be due to seepage of gas through service regulator diaphragms. This seepage occurred because of dry leather diaphragms, which had to be replaced in order to stop the leakage.

Many of the diaphragms removed were not damaged and were re-oiled for further use; but it was felt that a much longer life could be secured from the diaphragms if they could be protected from the drying action of gas passing through the leather, due to the building of pressure from a leaky valve.

After considerable experimentation it was found that a sheet of Cellophane placed on the top and bottom sides of the diaphragm in no way interferred with the normal action of the regulator, but did serve as a protection for the diaphragm material.

This practice has been continued for over two years and the results have been more than gratifying. Regulators equipped with Cellophane are being removed daily and few instances are found where the diaphragms are not in perfect condition.

It would be difficult to predict to what extent diaphragm life will be increased, but the slight added expense in regulator repair costs would be justified if the life expectancy were but a year or more.

No additional labor cost need be considered in the repair of the regulator and the cost of the Cellophane is very low.

Type No. 600 M.T. Cellophane cut in 10 x 10-inch squares is being used and when purchased in quantities the cost for each regulator is about 3 cents.

Because of this extremely low cost it is now general practice to so equip all regulators when repairs are necessary.

This company has a great many regulators in which rubber diaphragms are being used, and although these diaphragms are not oil treated and may give longer life than leather where natural gas is being distributed, yet the rubber is also Cellophane protected, in order to protect it from the foreign matter that will accumulate in a regulator over a period of time.

It occurs to the writer that this method of diaphragm protection would be particularly advantageous to localities distributing manufactured gas because there have been numerous instances where the naphthalenes have been known to pass through leather and accumulate on the top of the diaphragm.

If the use of Cellophane did not entirely eliminate this condition it no doubt would have a tendency to retard the action until Cellophane rupture occurred; because during the term of this practice no indications have been found where the Cellophane has been affected by oil or grease.

Rupture of the Cellophane can be prevented or retarded by care in installation and so the number of failures is dependent to a large extent upon the repairmen.

Many ruptures have been found, but in most instances the diaphragms were still in perfect condition. The ruptures were merely cracks which did not lessen the protection to any appreciable degree.

In fact the possibility of the cracks occurring was the influencing factor in adopting the double or top and bottom application. It did not seem likely that cracks, even if they developed in both pieces of Cellophane, would be directly opposite each other and so there would never be a time when the Cellophane was failing to give at least some protection.

This method of diaphragm protection is not claimed to be perfect, but the very apparent increase in life that can be expected from diaphragms so covered more than justifies the expenditure of 3 cents a regulator.

THE "DETROIT PLAN"

aims to substitute profit-sharing for future rate regulation, while encouraging efficient operation and continuous load-building

IN ITS November, 1935, issue WESTERN GAS briefly reviewed the agreement reached between the City of Detroit and the Detroit City Gas Co., under which existing differences were composed and a "profit-sharing" rate plan introduced. Mr. Fisher, who had a large part in reconciling city and company viewpoints and developing the "Detroit Plan," in this article gives some of the background leading to the present unique rate agreement effective in Detroit. Significant elements of the new plan are discussed in some detail.—EDITOR.

By F. P. FISHER
Consulting Engineer

AT the May meeting of the Natural Gas Department of the American Gas Association, Ralph W. Gallagher, former president of the Association, gave a broad discussion of public relations under the general topic of "Taxation and Legislation". Mr. Gallagher pointed out to the natural gas industry the supreme importance of finding a way to reconcile "the feeling of the public's inherent right in the utilities which supply them with light, gas and water, with its distrust of Government ownership and operation of these services."

In this memorable address he said in part: "The answer lies in the idea of possession. The public wants to be in control without carrying the responsibility of operation." After discussing various methods of regulation of utilities, designed to fill this gap, he said further: "It is not enough for us to conduct our affairs so as to merit the good opinion of our customers if this is not recognized in the public's attitude toward the utilities. . . . If popular thought about our business is wrong, we should recognize that as a problem to be corrected. . . . If the public thought is right, in condemnation of certain practices, it is imperative that we correct those things. . . . We must find that common viewpoint and from such point discuss our business in trustfulness and good faith. We must never forget that the natural gas business, as a private enterprise, rests on its acceptability to the public. . . . I consider it to be the most important duty of public utility management . . . to sit down with the representatives of Government and create a mutual understanding of these problems."

This address is quoted somewhat at length, for the very important reason that it laid down in broad, intelligent lines the basic principle of a program that was, at that very time, being worked out in the public relations of the Detroit City Gas Co. with the City of Detroit. Now that this program has culminated in "The Detroit Plan", as a constructive basis of cooperation between this utility and the City, it is desirable that the experience in Detroit should be generally known and understood in the natural gas industry.

Background on Detroit Situation

It will be helpful in understanding the aims and purpose of the "Detroit Plan" to follow a brief outline of the gas situation in this city which led to this negotiation and the steps by which the final agreement was evolved.

The Detroit City Gas Co. for years has been furnishing an excellent manufactured gas service to the City of Detroit at rates lower than the manufactured gas rates in any other large city, and has had a very good record for sales per average consumer.

Detroit, despite these facts, has had an accumulating sense of grievance in the gas situation due, partly, to the fact that most other large and important mid-western industrial cities were enjoying a service of natural gas. The lack of such service particularly handicapped Detroit because of the great concentration of industries for which natural gas fuel would be especially advantageous. Certain products that are utilized here were made elsewhere, in order to secure natural gas advantages. There have been various proposals, over a period of years, to bring natural gas to Detroit, and always before these plans have matured, there has been a disappointment. This has developed a growing public feeling of frustration.

This feeling was accentuated and brought to a focus on the occasion of the promulgation by the gas company of an increase in manufactured gas rates about the first of the year just ended. The gas rates in Detroit are not under jurisdiction of the Michigan Public Utilities Commission.

The City officials took steps to resist this increase in the courts and the stage was set for litigation, not only of the rate but of the right of the City to demand heavy rental for the use of the streets as a condition permitting the company to operate after the expiration of its franchise.

At this stage, through the initiative of Council President John W. Smith, the writer was employed to assist in preparing the City's case for court action, and to make an engineering study of the gas service problem generally. In the preliminary report given to the City Council in April, certain basic considerations were pointed out, among which were the following facts:

1. That under existing conditions there was little to hope for as improvement in the rate for manufactured gas.
2. The gas utility was well run and efficient.
3. The ideal solution for the Detroit gas service was to secure a supply of natural gas which, it was predicted, would eventually be offered and made available to the City.
4. The City should be prepared to intelligently require the most constructive terms as a basis for initiating natural gas service when it becomes available. This necessitated a survey of the potential industrial market for natural gas in Detroit.

These recommendations were approved by the Council, and M. J. Dewey was employed as associate engineer to assist particularly in the industrial survey, taking advantage of his

experience in developing an industrial market in Detroit some years previously.

Natural Gas Negotiations

This action resulted very quickly in negotiations between the City and the Columbia Gas & Electric Corp., representing the Panhandle Eastern Pipe Line Co., looking toward a market for the excess capacity of that line. The staff was reinforced by the employment of the writer's associate, J. M. Naiman of Chicago, who had assisted in the study of the system of promotional rates for natural gas for Chicago, and with the assistance of this staff, a study was made of the problem of transporting gas from the Texas Panhandle and distributing it to the Detroit market. As covered in the writer's report to the Common Council on June 8, this study yielded detailed facts on the following elements in the gas problem:

1. The cost and design of the Detroit City Gas Co.'s plant, in Detroit, and its adaptability to a natural gas service.
2. The cost of operation of the gas company's plant, with or without its gas producing plant equipment.
3. Complete information as to available quantities of natural gas, both in Michigan and the Panhandle of Texas, gas fields.
4. The cost of producing gas in the various fields.
5. The design of the existing pipe line from the Panhandle field to the Indiana-Illinois State line, including its potential carrying capacity.
6. The markets now served by this line and the potential capacity now available.
7. The present investment in the Panhandle Eastern Pipe Line.
8. The additional investment necessary to develop full capacity.
9. The cost of operation of this line.
10. The design and investment necessary for a pipe line extension from Illinois State Line to Detroit.
11. The cost of operation of such an extension.
12. The immediately available and potential industrial market for gas in Detroit.
13. The immediately available and potential domestic market for gas in Detroit.
14. A practical rate structure under which this gas can be sold in Detroit for these purposes.
15. A proper rate for the purchase of gas in the field.
16. A proper rate for the purchase of gas at the Illinois State Line.
17. A proper rate for the purchase of gas from the pipe line at the entrance to Detroit.
18. The proper design and cost of a high pressure industrial belt line in Detroit to serve the industrial market and reinforce the present piping system with additional distribution capacity.
19. The cost of operation and the earnings to be realized by such a belt line at the rate scheduled, at which this gas should be sold to Detroit industrial consumers.
20. The cost of operation and earnings to be realized by a combined system including the present distribution system and the proposed belt line at rates advantageous to industrial users and at substantially half the present rates on an equivalent heat basis to domestic consumers.

The report included detailed data sheets on the required investment, showing that it will be necessary to utilize certain present and additional investment as follows:

1.	FIELD INVESTMENT		
	Present Investment	$ 3,450,486	
	Additions Required	2,236,543	
	Total		$ 5,687,029
2.	PANHANDLE EASTERN PIPE LINE		
	Present Investment	$42,165,662	
	Additions Required	9,621,600	
	Total		$51,787,262
3.	EXTENSION ILLINOIS STATE LINE TO DETROIT		
	Investment Required	$ 9,570,200	
	Total		$ 9,570,200
4.	BELT LINE IN DETROIT AREA (For Industrial and Domestic Distribution)		
	Investment Required	$ 2,941,262	
	Total		$ 2,941,262
	Total Capital Exclusive of the Distribution System of the Detroit City Gas Co.		$69,985,753
	City Domestic Distribution	$61,360,008	
	Addition (consumers' adjustment)	1,113,369	$62,473,377
	Total Property (to be immediately utilized)		$132,459,130

Complete data sheets covering this study were presented to the Columbia Gas & Electric Corp. for engineering check and criticism. After exhaustive study, active negotiations looking to a contract were started by them, both with the City of Detroit, as a municipal buyer, and the Detroit City Gas Co.

The negotiations finally culminated in a contract between the gas company and the pipe line interests for delivery of gas to the Detroit City Gas Co. at the city gate, on substantially the terms and conditions recommended in our original study.

Signing of the contract for natural gas supply was announced early in September, and agreement was reached between the City Council and gas company for cooperatively working out the terms and conditions under which gas service would be rendered. This led to a series of conferences between the writer and Wm. G. Woolfolk, president of the Detroit City Gas Co., the results being reported to the Council on October 17 as a general recommendation for a "Detroit Plan", and a letter accepting the proposed terms and conditions from Mr. Woolfolk in behalf of the Detroit City Gas Co. was also read. This plan, stated briefly, provides:

1. A mutual agreement between the Detroit City Gas Co. and the City that the entire rate schedule, to be finally worked out, will be designed to have the maximum promotional effect in each class of utilization, such as water heating, space heating, commercial and industrial sales.
2. That as a result of the mutual study of the affairs of the gas company, a sum has been agreed on as a "base earning" necessary to keep the utility in healthy financial operating condition. It is agreed that this sum is not specifically related to the valuation of the company's property. The amount agreed on as a base earning is $3,850,000 net after depreciation.
3. That the next increment of additional earnings, in this instance $550,000 per year above the "base earning", shall be divided on a basis of 50 per cent to the stockholders and 50 per cent to the domestic consumers, in the form of an annual dividend payable after the close of each fiscal year.
4. That all additional earnings beyond the first increment, shall be divided on a basis of 25 per cent to the company's stockholders and 75 per cent to the domestic consumers, as part of this annual dividend.
5. That to the "base earning" will be added each year a sum equal to 7 per cent of the net additions to capital.
6. That the initial domestic rate schedule will be formulated before the completion of the pipe line, taking into account the estimated earnings from all of the industrial and commercial sales of gas which it is possible to develop or soundly estimate during the period of pipe line construction.

An outline follows of the surrounding considerations that led to the various specific items of agreement, and the objectives they were intended to attain.

Valuation

Most of the "rate" controversies of railroads and utilities center on a theoretical valuation structure sometimes called "rate base". These valuations are tremendously expensive, artificial, unreal and, as a means for securing effective rate regulation, have been almost wholly futile. They are carried out at great expense, in most minute detail by a highly trained corps of engineers and accountants, and most of the record of rate litigation is essentially a test of ingenuity. The conclusions as to valuation by responsible witnesses on opposite sides of the various rate cases often have been in such ridiculous disparity that the courts themselves have expressed a scandalized state of shock.

In the practice that has come within my experience, in cases where valuations have been contested with the utmost technical detail, other elements having more effect on the ultimate rate that any possible difference of valuation pressed by either party, were taken from expressed opinions, guesses and assumptions, so that the rate as finally found was like a weight determined on an accurate chemical balance by the use of a combination of counter-weights, some of which were crude and inaccurate and of unknown value.

One major objective in this agreement has been to eliminate such a valuation process from the current controversy. We have made most exhaustive studies

(Continued on Page 32)

Make the Most of F.H.A. Terms Before April 1

● P. G. and E. windows in scores of local and division offices were devoted to the Better Housing program.

NO DOWN PAYMENT
PROPERTY OWNERS CAN NOW BUY
GAS HEATING
AT A SAVING
3 YEARS to pay
10% DISCOUNT for immediate installation
SEE YOUR DEALER OR P·G·and E·

● One of several special bill stickers issued to P. G. and E. patrons, featuring F.H.A. terms for purchase of gas heating equipment.

WHILE there is reason to believe that long term financing for building betterments will be made available under Federal auspices after scheduled expiration of the F.H.A. plan next April 1, there is good psychology in bearing down on F.H.A. terms during the next three months, in the interest of gas appliance sales.

This line of reasoning has persuaded at least one western utility, the Pacific Gas and Electric Co., to build its early 1936 selling around a wind-up campaign on F.H.A. financing for major appliances.

P. G. and E.'s tie-in program on Better Housing has been outstanding among utility plans, and in fact served as a basis for recommendations issued by the Federal Housing Administration to utilities generally on suggested tie-in procedure. Of the 1,595 dealers with which the company maintains regular contact, 1,350 have used F.H.A. terms. Volume of company and dealer sales routed through F.H.A. financing was averaging $750,000 a month at the close of 1935.

The heart of your home
A MODERN HEATING SYSTEM!
BETTER HOUSING PROGRAM
Act Now! See your local banker for lowest cost, long term loans ever offered
Natural Gas Equipment Low First Cost Economical to Operate
SEE YOUR DEALER OR THE
P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY
Owned · Operated · Managed by Californians

The Better Housing theme has had an important place in all P. G. and E. advertising

Although P. G. and E. took its first steps in application of the F.H.A. program back in August of 1934, it was not until May, 1935, that sales effort was really marshalled behind the plan. At this time the company issued a set of interpretations of F.H.A. terms as applied to appliance sales and set up a formal financing procedure for use both on company and dealer sales. Incidentally, the company has had its own long-term sales plan in use for several years, under which financing charges average $8 per $100 discount table or 14-15 per cent net, as compared to the F.H.A. terms of $5 per $100 or 9.732 per cent net. The latter plan has carried the bulk of the company's own appliance contracts since it became available.

Two factors have been chiefly responsible for P. G. and E.'s outstanding success with F.H.A. First, full cooperation of local banks has been secured. Some 230 branches of American Trust Co. and Bank of America have been actively soliciting appliance financing through F.H.A.

Secondly, the company recognized that, good as it was, F.H.A. financing would not "catch on" automatically with dealers and with the company's own sales force. It was a program that had to be sold, and P. G. and E.'s sales department set out to do the job adequately.

The company first referred dealers to their banks for specific information on loan procedure. It soon became apparent that this would not get the desired cooperation, for bank red tape and lack of interest in small loans, at least in the early stages of the program, set up too much inertia to be overcome. So the company worked out its own plan, printed it, and through its 16 dealer promotion salesmen took it to the dealers, following up the original contacts month by month. The two banks which were actively after F.H.A. appliance loan business put on several men who also solicited dealers.

Special window trims were carried in 82 company offices. Window display contests featuring F.H.A. were sponsored among dealers. Billboards, bill stickers, and in fact all company advertising used the F.H.A. appeal. Full information was put in the hands of all floor attendants and salesmen and the company's force of 400 outside salesmen took the F.H.A. financing offer directly to the public. All of this built up a momentum of sales which reacted favorably upon dealers' volume and built enthusiasm for cooperation with the P. G. and E. on the plan. Those dealers who put the maximum effort

(Continued on Page 36)

Gas industry exhibit at All-Australian Exhibition, held during Centenary celebrations last year.

UNIQUE DEMANDS

Sales Coordination Is Problem for Scattered Gas Properties

THE COLONIAL Gas Association is not, as the name might suggest, a trade Association. It is a limited liability company, with headquarters in Melbourne, Victoria, and gas works in every State of the Commonwealth, except Tasmania. In addition it owns a number of subsidiary interests, some of which are closely allied with the gas industry, while others are somewhat remote. Its major gas interests are in certain populous suburban areas of Melbourne. Queensland interests are also considerable, the gas supply to such cities as Rockhampton, Townsville, Ipswich, being controlled by the "C.G.A.", as it is generally called. Then there are two of the outer suburbs of Brisbane for which the gas supply is in the hands of the Association. In New South Wales the city of Maitland is supplied by the Colonial Gas Association's undertaking, as are the smaller centres of Grafton, Tamworth, Casino, Wollongong, Singleton and Hay. A number of progressive country towns in Victoria are also supplied, one "up-and-coming" centre in South Australia, and one in Western Australia. It owns a chemical works and a dry ice plant in Brisbane, and two tar distilleries and an ammonia plant in Melbourne.

Naturally it has its problems, not the least of which is the co-ordination of sales promotional activities. This is extremely difficult in the light of (in most cases) distance from headquarters, and widely differing climatic conditions and seasons, with a varied outlook in the people and divergent ideas of what is best and most suitable in the way of gas appliances. The climatic or seasonal factor is important. Nearly half of the total area of Australia is within the torrid zone, and it is believed that Townsville is the largest purely white tropical settlement in the World. Rockhampton, too, is situated just north of the tropic of Capricorn, and these two cities, embracing little short of 60,000 people between them, must receive somewhat different treatment from our centres in Southern Queensland and Northern New South Wales, which are sub-tropical, and in turn demand a somewhat different technique and sales argument from the Victorian areas of supply, which enjoy what might be termed a Mediterranean climate. In fact, my experience and general observations force me to the conclusion that each Australian State must be regarded as a separate market, and very few advertising campaigns, or promotional efforts generally can be designed to cover, uniformly, the whole of Australia.

To plan from Melbourne would mean a vaguely generalized message that would lack the necessary vigor or punch, and the parochial spirit, which is never entirely absent in Australia, even amongst the most enlightened, would be stirred by something which too obviously had its origin in Melbourne being "put over" in Queensland or New South Wales. As for instance we might feature a certain make of gas stove which is not known to any extent in either of the other States mentioned. We might quite conceivably show a sporting background—a football field say with a hot water tie-up. If a Queensland or New South Wales paper were to carry our message, the game would obviously have to be Rugby, but if a Victorian paper, we would have to show the Australian Rules game in progress. There are tremendous differences in the two games, which I need not go into here.

Architecture is different, the living habits of the people are entirely different, and while they are of course actuated by the same mental and moral, emotional, and general psychological urges, they do appear to have different standards and a different outlook. Thus Sydney and Brisbane are laughing, lighthearted cities, with a hand of welcome outstretched to the stranger. Melbourne and Adelaide are more reserved—Melbourne much more so. Not frigid, I would have you believe, just somewhat shy of trotting out its family album until it knows you better. And the weather. Sydney and Brisbane have about double Melbourne's and Adelaide's rainfalls, yet they have fewer rainy days, and generally more reliable weather. Sydney visitors to Melbourne have an odd habit of drawing their overcoat collars tight up around their ears, in any weather, doubtless as an expression of loyalty to the Sydney Chamber of Commerce, while they utter highly deprecatory remarks about our climate, I imagine, to appease whatever Diety watches over the Sydney Tourist Bureau.

This is all by the way, but it may enable the reader to envisage a certain difficulty which the C.G.A. alone amongst Australian gas undertakings, has to meet, and it hints at a barrier to anything of a national character being undertaken by the gas industry as a whole. In the capital cities, where more than one gas company enjoys the privilege of supplying gas to the entire metropolitan area, there is some cooperation both of an official and an unofficial character. In Melbourne some cooperative advertising is carried out between the major company, and two of the smaller concerns—the C.G.A. being one of these—but nothing spectacular has ever been accomplished, because of minor differences in prices and terms, and major differences in policy.

The gas industry in Australia of late years has experienced serious electricity competition, and this is particularly the case in Victoria, where a heavily capitalized State undertaking generates current from enormous deposits of brown coal in the eastern section of the State. It manufactures brown coal bricquettes and these, too, compete both

ON GAS SERVICE IN AUSTRALIA

By W. S. EDWARDS

Publicity Officer, The Colonial Gas Association Ltd.
Melbourne

Demonstration home erected in suburban district of Melbourne by The Colonial Gas Association, Ltd.

with gas and coke. The ordinary electric tariff in most of the populous centres of the State which take their current from the State concern are low enough, in all conscience, but the special water-heating tariff is a veritable pain in the neck, and as State enterprises are not subject to the same charges as an ordinary private undertaking, and appear to be devoid of any noticeable sense of responsibility, charges can quite conceivably come still lower. We are not up against oil competition, except in industry, and generally regard electricity and cheap firewood as our principal domestic competitors.

Probably the best advertising effort the Australian gas industry has yet put forward was the exhibit staged at the All Australian Exhibition during the Centenary celebrations last year. This exhibit cost something exceeding $10,000, and confined the display to Australian-made appliances. It covered an area of some 2400 square feet, and was popularly regarded as the outstanding display at the Exhibition. The accompanying photographs will convey an idea of the exhibit.

Water heating has never particularly attracted the Australian gas industry until recently, when through the efforts our electrical friends were making, more than usual attention was focussed on this load. Now a great deal is being done to get this business, and marked success has been achieved in Sydney.

A somewhat new development in sales promotional methods in Australia has been inaugurated by the C.G.A. in one of its Melbourne suburban districts. An enterprising builder cut up an estate of 12 acres on which he is at present erecting 64 small homes, to be sold on very easy terms. We selected one site at random, and made some minor alterations to the plan and specifications. The house is now up, and is equipped with modern gas appliances, as shown in photographs with this article. It is not a model house nor an ideal home, but is intended to show that even the small home, for the man on a modest income, can be equipped with high-grade gas appliances, including a gas hot water service. Ultimately, when the home has served its turn as a display house, it will be sold, and any loss incurred in equipping it will be charged against publicity. We do not anticipate any considerable loss on the transaction.

Little contact has hitherto been maintained with the press, which I might mention, in Australia, is not nearly as accessible as I understand your American press to be. Our principal papers are very independent and do not go out of their way to say extraordinarily kind things of their advertisers. Still there is a growing appreciation of the need for maintaining a friendly contact with the press and pressmen, and we have seen one newspaper go from active hostility to a major gas undertaking, to reporting at length the transactions of the Australian gas industry's centenary congress in Melbourne last year.

It may be mentioned in connection with the subject of press advertising that the work done by the Australian Gas Light Co. in Sydney, in this direction, would compare more than favorably

(Continued on Page 63)

Gas for hot water heating and for industrial uses, featured in All-Australian Exhibition gas industry display.

HOUSE HEATING FUNDAMENTALS . . . . NO. 3

The Heating Plant

By B. A. JOHNSON

Staff Engineer, Space Heating Division,
The Peoples Gas Light and Coke Company

AS cities grew up and fuel became more scarce, there developed the necessity for obtaining greater heat value from fuel. This brought about the designing of the early types of stoves (the Franklin stove) and then the enclosed stoves. As houses increased in size, efforts were made to design some kind of heating apparatus to take care of more than one room, or of several rooms, from some central source. For this purpose sheet or tin pipes were used for conducting the heated air from the stove to various rooms. The modern heating plant is an outgrowth of this old arrangement.

B. A. JOHNSON

There have been constant developments, of course, in more recent years on all types of central heating until, at the present time, a marked degree of perfection has been attained and ever increasing use is being made of central heating plant equipment in all types of buildings.

In the handling of this subject, we find that the heating plant (boiler or furnace) divides itself into four integral parts:

1. The space provided to burn the fuel (Combustion chamber).
2. The materials and means employed for absorbing the heat generated (Heating surfaces and fuel passages).
3. An agent to take the heat away from the heated surfaces and convey it to the space to be heated (Air or water).
4. A provision for disposing of the products of combustion (Flue and chimney).

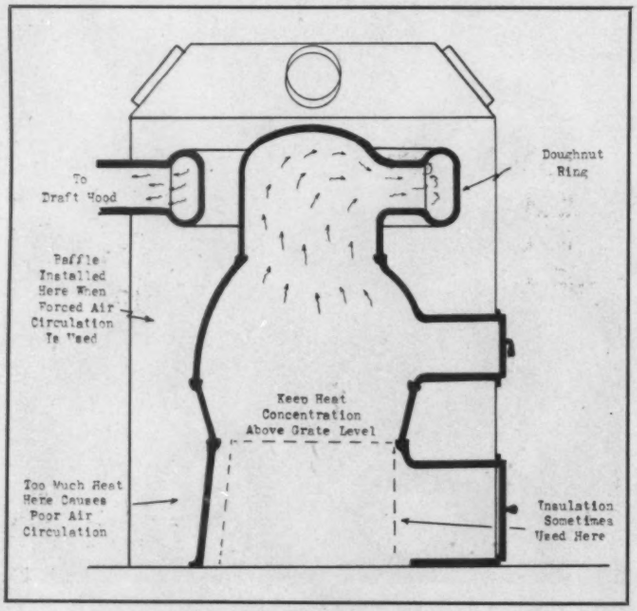
Whether the fuel be gas, coal or oil, the first three of these provisions are substantially the same. The provision for disposing of the products of combustion, although at first thought it seems about the same for solid and liquid fuels as for gas, involves some principles which are entirely different. These principles will be taken up in detail later under "Flue Gas Disposal Equipment."

Gas-Designed Heating Plant

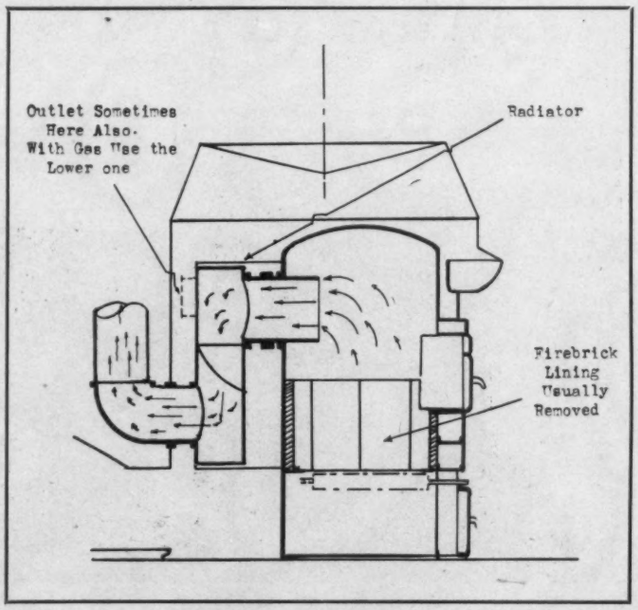
The term "gas-designed equipment" refers to a heating plant including gas burner equipment which is designed primarily for the use of gas as the fuel. Much of the equipment on a gas-designed heating plant consists of controls and burners used to burn gas, the principles of which have been covered in the previous two articles. Therefore, insofar as the subject of the heating plant is concerned as applied to gas-designed equipment, this deals only with construction features which have to do with the combustion space, with the heat absorbing materials and with agents for taking care of flue products.

It is the usual practice with gas-designed equipment to build a boiler or furnace with almost all indirect heating surface, that is, the gas is burned in a small combustion chamber and the heat liberated is carried by the flue gases over a large amount of surface, giving up heat to this surface. In turn, the heat passes through the heating surface to the "heat conveying agent" (water or air).

Material used in both boilers and furnaces is usually cast iron. Flue travel is usually in a continuous upward direction to the flue entrance except in some gas designed furnaces where revertible flue passages are provided to obtain the desired length of flue travel.


To Draft Hood
Doughnut Ring
Baffle Installed Here When Forced Air Circulation Is Used
Keep Heat Concentration Above Grate Level
Too Much Heat Here Causes Poor Air Circulation
Insulation Sometimes Used Here

DOUGHNUT TYPE FURNACE.



STEEL RADIATOR TYPE FURNACE.

Types of Coal Heating Plants

Because of the fact that conversion burners have become popular applications in the gas field and that their use is for adapting coal furnaces or boilers to gas-firing, a few explanations are given herewith to show some of the various types and constructions of coal boilers and furnaces with regard to their conversion to gas-firing.

Furnaces: Furnaces are classified by the material used in construction and also by the shape and arrangement of the flue passages.

The familiar doughnut type, so named because the secondary heating surface (heating surface is used to absorb heat after flue products have left the combustion chamber) is a circular ring shaped like a doughnut. Its construction is cast iron throughout. Flue gases enter usually at the front of the furnace and travel back through each half or, in some cases, enter the furnace at the back and travel completely around this doughnut ring before entering the flue pipe. In the latter type a damper arrangement is usually embodied which allows for short circuiting of the flue products directly from the combustion chamber into the flue. In the application of conversion burners to this type, it is important that the damper be set in such a position that all products of combustion are made to travel completely around the radiator and not directly from the combustion chamber through this damper opening to the flue because a very high flue loss results when this is permitted.

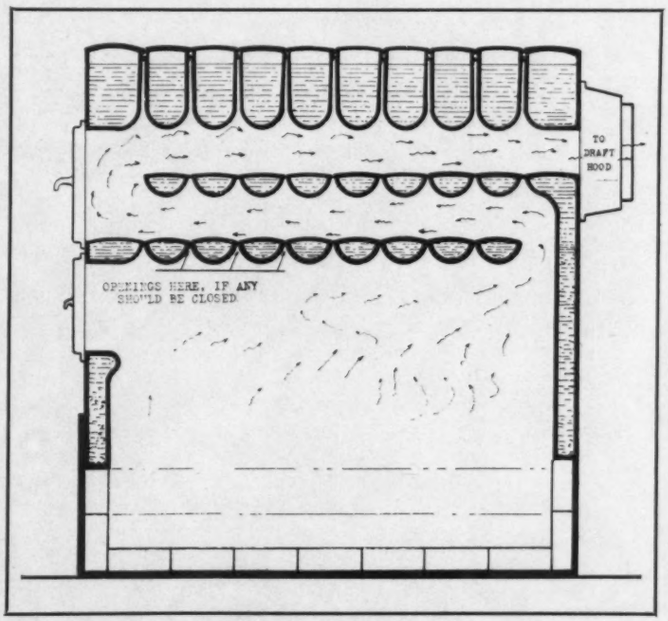
Most other types of cast iron furnaces are modifications of the doughnut type, having several entrances to this doughnut instead of one or two.

Steel furnaces usually consist of a welded steel firepot section lined with refractory material to protect the steel and having various shaped steel radiators welded to the combustion chamber, with flue passages usually directed downward before entering the flue pipe. In the application of conversion burners to this type, it is the usual practice to connect flue pipe to the lowest connection in order to insure maximum heat absorption by making *all* flue products travel over the entire heating surface. When this is done, however, the resistance through the flue passages as a result of this downward travel is sometimes so great that a chimney pull is necessary to insure proper draft on a gas burner and, since with a draft hood the draft is usually negligible, the appliance cannot operate successfully unless a forced air type burner is used.

In some cases, to insure against possible pocketing of gases in the top of combustion chamber of down draft furnaces, a small bleed connection (by-pass) is tapped from the top of the combustion chamber to the chimney or flue pipe at a point level with or above the combustion chamber.

Firepot refractory linings are usually removed when conversion burners are installed to obtain a greater heat absorption in the firepot. However, when this is done, it is important to prevent deterioration to have the burner arranged so that there is no flame impingement on the steel surface.

Steam and Hot Water Boilers: Steam and hot water boilers are classified into two general types, namely cast iron and steel. The cast iron is subdivided into round and sectional, and the steel classified as to water tube and fire tube.



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TYPICAL SECTIONAL BOILER

In gas applications flames are deflected to side walls to scrub heating surfaces or concentrated in a firebrick box, flue products traveling as shown.

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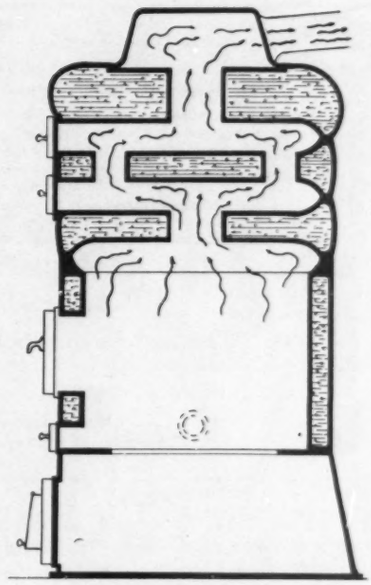


TYPICAL ROUND BOILER.

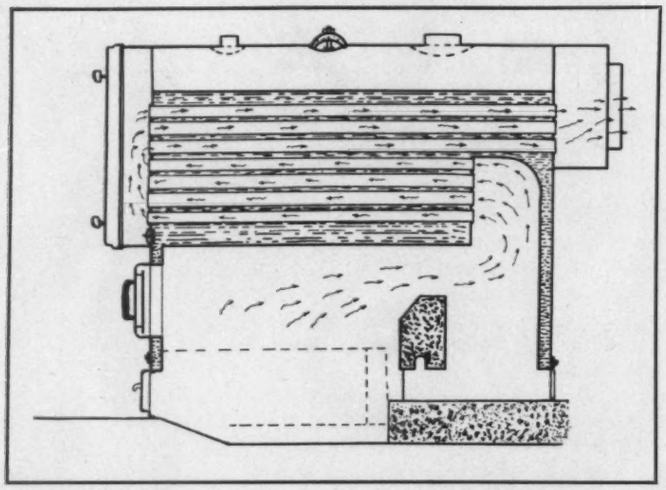
Round boilers are made up of a series of sections and usually are designated by the number of sections they contain, as follows:

First Section—Ashpit.
Second Section—Combustion Chamber.
Intermediate Sections.
Dome.

A boiler having one intermediate section is designated as a four-section boiler, one having two intermediate sections as a five-section boiler, etc. Flue travel through these boilers is usually upward in a staggered direction depending upon the arrangement of openings in the sections.

Cast iron sectional boilers consist of a series of vertical sections arranged horizontally and, except for the grate, arranged in such a way that the inner space of these sections comprises a combustion chamber. The flue gases in this type of boiler, as they travel through the passages then are moving in a horizontal direction instead of in a vertical direction and again it sometimes happens that if horizontal travel is exceedingly long, the resistance to natural draft is high and a problem in conversion burner application arises which necessitates larger flue pipes than the standard calls for, or forced air type burner or baffling limitations. It is also important in conversion burner application to this type of boiler that short circuiting of flue gases be prevented by carefully cementing between sections.

Steel boilers of the fire tube type (fire tube means that products of combustion travel through tubes surrounded by water), or water tube (tubes filled with water surrounded by products of



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TYPICAL FIRETUBE BOILER

Burner application usually arranged to have fire concentrated in the firebrick box and the products traveling as shown.

▼

combustion), are arranged in various designs to give long flue travel and in the application of gas conversion burners very little can be done to improve this phase of operation. However, these boilers are usually brick set and if not given the proper attention when a conversion burner is installed, air leaks will result, creating a high flue loss.

Flue Gas Disposal Equipment

After leaving the combustion chamber, the flue gases pass through additional heating surfaces of the boiler or furnace, on to the chimney through a flue pipe and a draft diverter.

1. *The Flue Pipe:* The flue pipe serves a dual purpose—(a) To conduct the flue products to the chimney; (b) To control the amount of excess air by being sized in proportion to the amount of gas being burned. This second point is sometimes a very important factor to the successful operation of conversion equipment.

When firing a boiler with coal a certain amount of draft is *necessary* not only to carry away the smoke and unburned fuel but also to provide a suction in the firepot sufficient to draw the proper amount of air through the fuel to properly burn it.

When firing this same boiler with gas, no chimney draft should be required. The gas passing through the burner orifice induces part of the air required for combustion and the additional air (secondary air) enters by a natural draft created in the appliance through the burning of gas itself. Therefore, the primary controlling factor for air on a gas-burning appliance can be had either at the inlet where adjustments can be made to admit just the proper amount of air to complete combustion, or at the outlet of the appliance where the opening can be adjusted to control the amount of secondary air being taken into the appliance.

Thus, it can be seen that if the flue outlet were sized to control the amount of products of combustion that come through,* the secondary air adjustment on a burner can be wide open (provided of course that the secondary air is directed to a point at which gas is burning).

2. *The Chimney:* In burning gas in atmospheric burners, chimney draft is not required to supply the air for combustion as is the case with solid fuel. The sole function of the chimney is to remove the products of combustion from the house.

3. *The Draft Diverter:* The draft diverter serves three purposes:

(a) It is the device which separates the boiler from the chimney in such a manner that changing draft conditions in the chimney do not in any way affect the adjustments of the burner.

(b) It is also constructed so that in case of a down draft, the back pressure from the chimney is relieved without affecting the burner adjustments. Under such conditions the products of combustion spill out from the skirt or head of the diverter into the room.

(c) It also allows the appliance to operate correctly in case of chimney stoppage.

The draft hood illustrated was developed in Chicago after many tests were made to insure the satisfaction of all of the three requirements mentioned above. It also has a distinct feature in the adjustment baffle which makes possible the standardization of flue size and individualizes each job by sizing flue pipe to a finer degree by means of this baffle arrangement.

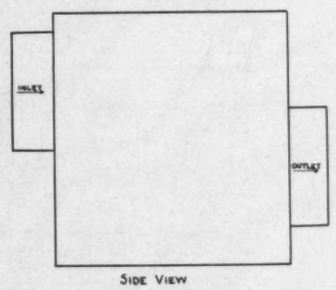
Baffling

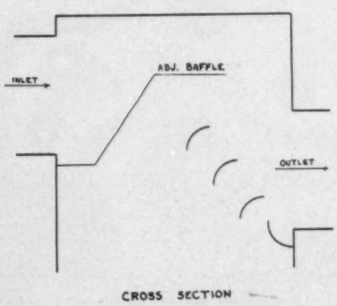
Manufacturers of conversion burners design their equipment so that the greatest possible part of the heat generated can be absorbed in the firepot proper, and try to depend very little upon the upper flue passages for heat absorption.

In many coal boilers the heating surface in the firepot is insufficient to absorb enough heat to get high efficiencies and thus it is *necessary* to depend on the upper flue passages for additional heat absorption to get the desired results. However, the upper flue passages in most coal boilers and furnaces are of such design and shape that additional heat absorption is very small unless these passages are baffled to increase the length of travel of the flue products and also to create a scrubbing action of these products on the heating surfaces.

Thus, in considering this subject in connection with gas heating installations heating engineers would naturally specify that baffling be done as part of the installation work when it is felt that this will increase the overall efficiency of the system by increasing the heat absorption in the upper flue passages. It should be borne in mind that the

(Continued on Page 55)





DRAFT HOOD.

*This flue sizing can be standardized for a large number of appliances of the up-draft type and for most gas jobs it is in the neighborhood of 7,500 B.t.u. input per square inch of flue area. However, this figure would change appreciably for appliances where the resistance through the flue passages in the boiler or furnace is above normal as in the case of long sectional boilers having considerable horizontal flue travel and in revertible flue type boilers and furnaces where the flue gases after traveling upward are directed downward to a point almost as low as the burner head level or in some particular appliances even below this. In the latter type where the revertible flue travel is below the so-called grate level, atmospheric burners cannot operate successfully without the aid of chimney draft.

MAKING A NEW NATURAL GAS COMMUNITY HEAT CONSCIOUS

By GEORGE H. FINLEY
Editor, Western Gas

CHANGING the fuel habits of a large western community in something less than two years, and considerably less than two full heating seasons, is the accomplishment to which the Central Arizona Light and Power Co. can lay credit in its Phoenix service area.

Situated in the Inter-mountain region, in the heart of fertile Salt River Valley, Phoenix before the introduction of natural gas, brought her domestic, commercial and industrial fuel from many miles distant — from the coal mines of Utah and Colorado; and from oil fields of mid-continent and Pacific Coast. Freight charges kept fuel prices relatively high, and when decision was reached in 1933 to extend the Western Gas Co. system to Phoenix this matter of relative fuel costs gave natural gas an advantage upon which the gas company was quick to capitalize. How the company laid and executed its plans for putting on the maximum amount of natural gas load in the minimum amount of time is the burden of this story.

Natural gas reached Phoenix late in January of 1934. It was a completely new fuel idea to the Phoenix householders, and the first season the 400-odd heating installations sold were ordered in with some misgiving. All of them were installed by the gas company, for as yet no interest had developed among heating contractors.

Heating experience through the winter of 1934-1935—the first full heating season on the new fuel—convinced the early users of gas heat that they had done wisely in changing fuels. Bills, which had purposely been estimated a trifle high, showed savings averaging 25 per cent under coal costs.

As the 1935-1936 heating period approached, the company shaped its plans to make the most of the customer-satisfaction created by the experience to date with gas heat. A summer heating campaign was laid out, to be introduced by a series of testimonial advertisements. As an inducement to submit testimonial letters the company offered a set of copper cooking utensils for every letter which was used in its advertising series. Care was taken to make the testimonials representative of all classes of income; socialites, business leaders, policemen, professional people, laborers, all gave their versions of gas heating benefits in the series.

POLICE OFFICER TAGS GAS HEAT
Excerpts from Letter Written by J. S. Bolin
The Bolins Selected A Circulating Heater
BUY GAS HEATING EQUIPMENT NOW!
SAVE 10% SUMMER DISCOUNT
Trifling Down Payment With Installation
NO PAYMENT UNTIL OCTOBER
F. H. A. TERMS FOR HOME OWNERS
CENTRAL ARIZONA LIGHT AND POWER CO.

Testimonial advertising introduced the 1935 summer drive on gas heating in Phoenix.

SMALL CHANGE
JUST A HANDFUL OF PENNIES, NICKELS AND DIMES... NOT MUCH...
ONLY 3 MORE DAYS!
OUR SUMMER DISCOUNT OFFER
EXPIRES SEPTEMBER 1st
INSTALL NATURAL GAS HEATING EQUIPMENT NOW AND
SAVE 10%
SMALL FIRST PAYMENT
PAY NO MORE UNTIL OCTOBER
F.H.A. TERMS FOR HOME OWNERS
Central Arizona Light and Power Co.

Economy appeal put a punch in Central Arizona Light & Power's ad copy.

Company salesmen produced most of the testimonial letters, hand-picking them with a view not only to including all income groups but also neighborhoods which would be recognized as representative ones by readers of the newspaper advertising. Twenty-four advertisements were developed around such testimonials and run in five-column 15-inch insertions. Headline style captions were employed with these ads, such excerpts as "Gas Heat Saved Me 50 Per Cent" being picked up from the body of testimonials to form the headlines.

Needless to say, this style of appeal was not hard to understand, and was tremendously effective in creating a receptive interest in the gas heating story.

On starting its 1935 summer heating campaign the company laid itself open to considerable good-natured ridicule; selling heating in the middle of an Arizona summer, when temperatures range over the 100° mark, does call for a good deal of courage—or at least a genuine confidence in the product. A 10 per cent summer discount was the only special inducement offered.

The campaign opened on June 1, running to the end of August. Newspaper advertising was carried on continuously during this period, and fell into three general types of copy. First came the testimonials described above, running through the month of June. This series was supplemented during June with a dramatized radio dialogue, broadcast twice weekly for 15-minute periods. Script was prepared by the Central Arizona Light and Power Co.'s advertising department and introduced a Phoenix housewife who insistently "plugged" gas heat and the convenience of not having to build fires, until her husband finally succumbed and installed a floor furnace.

With July a new type of newspaper copy, devoted to describing the various classes of equipment for supplying gas heat, was introduced. Along with this series came a character known as "Blue Blaze Scotty," symbolizing clean,

(Continued on Page 58)

BURNING LIME WITH

THE economic soundness of low offpeak rates for the purpose of improving load factors has long been established and recognized by gas utilities.

The introduction of natural gas in many territories recently and the addition of large blocks of peak business has made the fast building up of "summer valleys" imperative and resulted in the exploitation of the most fertile field for that purpose, namely, large volume steam generation and metallurgical processes.

Lime burning offers a good example of a class of business which may be added to existing loads during the offpeak season at prices considerably higher than those obtainable for steam generation or various metallurgical processes.

In fact, this operation presents an ideal load regardless of season because it is necessarily a continuous process with a load factor in many cases approaching 100 per cent.

It fits in well with the plan for the economic distribution and sale of gas since the offpeak season in the gas business is usually the peak season in the lime industry, especially in those plants where building lime is manufactured exclusively.

In addition, in most cases where standby kilns are not available, the installation of gas-burning equipment can be so accomplished that a reversion to the old method of firing during the peak season requires a minimum of labor and expense.

The burning of limestone dates back to the earliest period in the history of civilization and is one of the oldest chemical industries. But in spite of that fact a remarkably small amount of progress has been made in the technology of this process until recent years.

Definition and Classification

The general term "limestone" is applied to those classes of rocks which range in chemical composition from 100 per cent calcium carbonate ($CaCO_3$) to 55 per cent calcium carbonate with magnesium carbonate ($MgCO_3$) replacing the $CaCO_3$ in equivalent amounts.

Limestone containing from 95-100 per cent $CaCO_3$ is usually referred to as a high calcium limestone. When the ratio of calcium to magnesium is approximately 55.45 it is known as a "dolomite." Between these extremes it is generally called a "high magnesian stone."

In physical characteristics limestone will vary greatly, even though the chemical composition may be identical, and each variation will affect the operation of the kiln and the product desired.

Essentials in Lime Burning

Regardless of the fuel used, there are three essentials which must be satisfied in the burning of limestone:

1. Heating to the dissociation temperature.
2. Holding at that temperature for a sufficiently long time to furnish the necessary heat to effect the dissociation of the carbonates.
3. Removal of CO_2 gases liberated during dissociation.

Dissociation Temperatures

The theoretical dissociation temperatures are generally assumed to be about 1500° F. for dolomitic limestone and 1650° F. for high calcium stone. In actual practice, however, temperatures as high as 2300° F. and 2500° F. are used to furnish the thermal head necessary to effect penetration of the heat to the center of the rock as soon as possible. The higher the operating temperature, the higher the efficiency and production which may be expected from a kiln. There are at least two important factors limiting the maximum temperatures which may be carried. These are the possibility of overburning the lime and slagging of the kiln refractories.

Since overburnt lime is useless, it represents a large loss in labor and fuel. Obviously slagging of refractories should be avoided since it necessitates shutting down of the kiln and involves expensive repairs.

Factors Affecting Kiln Temperatures

The actual factors which determine the temperature to be used are many and varied, the most important ones being the size of the stone charged, its physical and chemical properties and the resulting product desired.

The average size of stone charged into vertical kilns in most plants is from 4 to 12 inches in diameter. Since the penetration of heat varies directly as the surface exposed, it can be seen that a considerably longer time will be required to burn a unit weight of the larger stone than the smaller. Under those conditions, if the larger stones are properly burned, the smaller stones will be overburned and vice versa regardless of the calcination temperature since the burning of lime is a time-temperature function.

The chemical and physical properties of the stone have an important bearing on the operating temperature since as noted before a dolomitic limestone will dissociate at lower temperatures than a high calcium stone. A finely crystalline stone will require a lower temperature than one more porous because of its higher heat conductivity. The presence of impurities will also tend to lower the temperature at which overburning takes place. Chemically pure lime would be difficult to overburn at even the extreme temperatures carried in kilns. The product desired is, of course, the most important factor in determining the operating temperature. Unfortunately, the best lime is usually produced in the lowest temperature range, which as pointed out before is not conducive to highest efficiencies and productions. The choice of temperature therefore always involves the sacrifice of one desirable feature to obtain one more desirable.

Chemistry of Dissociation

Lime burning is essentially a simple process which consists of heating limestone until the carbonates of calcium and magnesium are broken up, resulting in the expulsion of carbon dioxide gas and leaving a solid mass-lime. The reaction is endothermic and reversible.

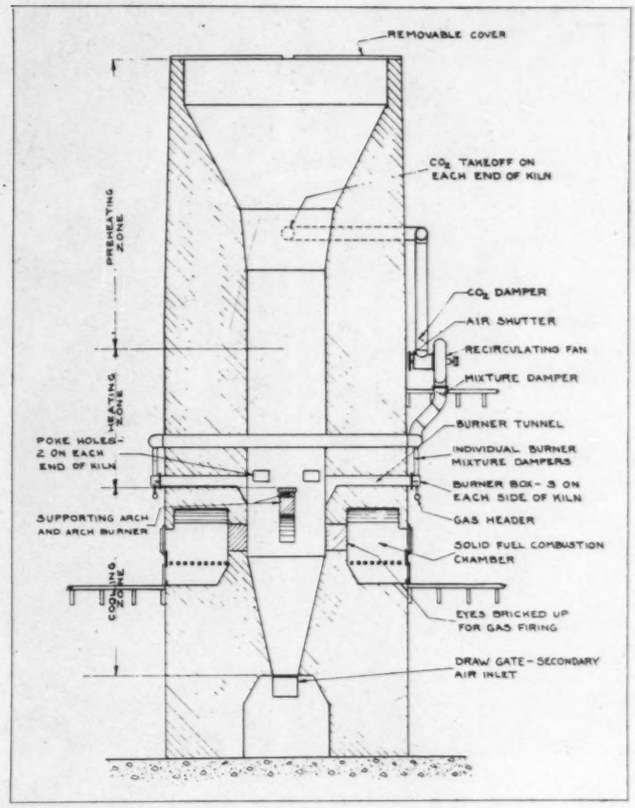
$$CaCO_3 \rightleftarrows CaO + CO_2$$

Limestone	Lime	Carbon Dioxide Gas
100	56	44

Substitution of molecular weights in the above equation indicates that for every 100 pounds of limestone charged into the kiln there is produced 56 pounds of lime and 44 pounds of CO_2 gas. With a dolomitic limestone the ratio approaches 52 pounds of lime and 48 pounds of CO_2. So we may say that approximately ½ ton of lime is produced from 1 ton of limestone. Carrying this thought along further, it will necessarily hold that the percentage of the impurities in

GAS FUEL

By JOSEPH KAHN
The Peoples Gas Light and Coke Company, Chicago, Illinois



AT RIGHT

Section through a typical lime kiln indicating gas burner application using recirculated flue products.

the original limestone is doubled in the lime produced.

In the absence of exact data, the heat of dissociation may be assumed for all practical purposes to be 700 B.t.u.'s per pound for high calcium stone and 600 B.t.u.'s per pound for a dolomite.

Assuming a calcination temperature of 1660° F. and an average specific heat of .22, the theoretical B.t.u. input to burn 1 ton of high calcium limestone will be:

Heating to dissociation temperature
$2000 \times .22(1660-60) =$ 704,000 B.t.u.
Heat of Dissociation
$2000 \times 700 =$ 1,400,000

To burn 1 ton limestone 2,104,000 B.t.u.

$\frac{2,104,000}{.56} = 3,757,000$ B.t.u. to burn 1 ton of lime.

A similar calculation for dolomite will indicate a considerably lower heat requirement.

Removal of CO_2 Gases in Kiln (Draft)

It is important that the CO_2 gases evolved during the dissociation process be "swept out" of the kiln as soon as possible to avoid building up of the pressure of CO_2 gases to the critical point where dissociation would reach a standstill.

In explanation of this point, let us again refer to the lime reaction. When heat is applied to calcium carbonate under the proper conditions, lime and CO_2 gas will be formed. Likewise, under the proper conditions, lime and CO_2 will recombine to form $CaCO_3$, since the reaction is reversible.

If the draft is poor and the pressure in the kiln reaches the critical point, a recombination of lime and CO_2 will take place and no lime will be made under these conditions regardless of how much heat is supplied to the kiln.

It is therefore essential that a sufficient draft be carried in the kiln to effect a continuous removal of gases.

In view of other very important considerations, however, which will be discussed later, the draft should be held as close to the lower limit as possible.

There is also danger of recarbonation when the kiln is abnormally cooled. The simultaneous occurrence of the two objectionable conditions of "pressure" and "cooling" will quite often take place when the drawgate is opened for the purpose of drawing lime. The heat supply, therefore, should never be diminished when the lime is being drawn.

Ideal Fuel for Lime Burning

The ideal fuel for lime burning should be capable of producing:

1. A cool flame to avoid overburning of the lime.
2. A long flame to avoid localized spot heat and to insure penetration to the center of the kiln.
3. A luminous flame to effect penetration of the heat to the center of the rock.

Since wood satisfies these requirements, it has long been considered the ideal fuel by lime burners. Its advantages, however, are offset by its high cost in most sections and the inherent objections of hand firing.

Natural gas very closely produces the desirable flame characteristics of wood and in addition because of its flexibility and ease of control overcomes the serious difficulties of hand firing. As the hydrogen content of a gas increases its desirability for lime burning decreases, since hydrogen with its very rapid flame propagation produces high flame temperatures and a short, sharp flame, and lacks luminosity. For this reason, manufactured gas and mixed gas such as are available in the Chicago district, must be diluted by some means to overcome the deleterious effect of the hydrogen. Any attempt to burn these gases "straight" will usually be doomed to failure.

Conversion to Gas Fuel

The truth of this statement was forcibly brought out to engineers of The Peoples Gas Light and Coke Co. some time ago when a standard natural draft separate feed kiln was converted to burn mixed gas (approximately 50 per cent natural and 50 per cent coke oven gas) containing approximately 24 per cent hydrogen with a heating value of 800 B.t.u.'s.

The kiln was 5 feet 6 inches by 7 feet 6 inches in cross section, and measured 45 feet from the drawgate to the top. It was equipped with two combustion chambers on opposite walls, the products of combustion entering the kiln from each through three arched openings known as "eyes." The fuel used was wood.

Operating along the same lines as most of the natural gas fired kilns at that time, three burners were inserted in each combustion chamber, one at the

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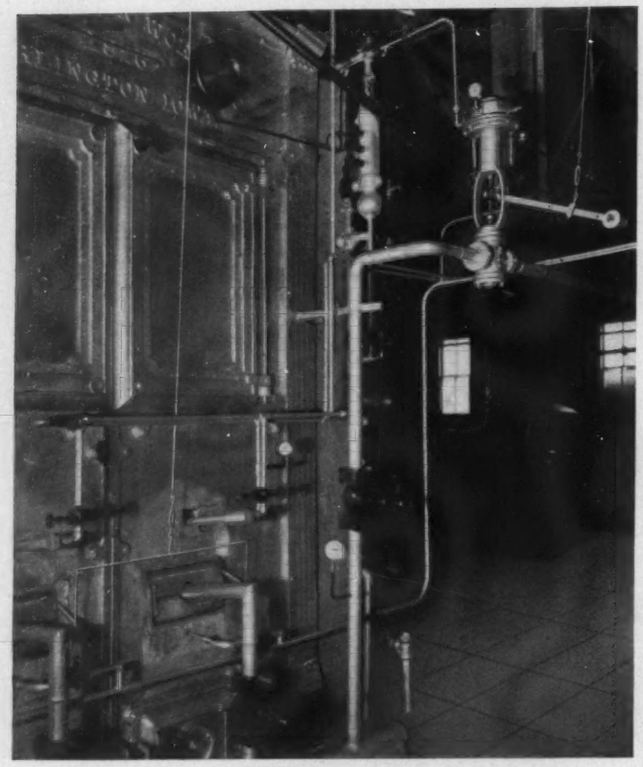


FIG. 1.

Illustrating application of boiler gas fuel governor which uses gas-operated pilot valve to control main diaphragm valve. Note flexible cable connected from lever of controller to lever on louver doors at burners.

Automatic Control Equipment for Industrial Steam Boilers

● KENNETH R. D. WOLFE, Fisher Governor Co., Marshalltown, Iowa; addressing Mid-West Gas School and Conference, Iowa State College, Ames, November, 1935—(Abstract by WESTERN GAS).

IN the boiler plant, combustion is intimately related to the production of steam, which demands the coordination of five variables—steam, water, fuel, air, and flue gas. Any control system, whether manual or automatic, must consider the pressure and flow of the different variables in accordance with the steam demand. The first consideration is that the steam pressure be maintained constant or nearly constant by varying the rate of combustion with the steam demand; second, that the furnace pressure be maintained at, or slightly below, atmospheric pressure. Operating costs add a third requirement, namely: the fuel air ratio must be maintained so as to give the highest over-all efficiency, consistent with reasonable furnace maintenance.

As the primary purpose of the boiler is to make steam, this is the most important of the five variables and is used as the control factor for the rate of combustion, either by maintaining the drum or outlet pressure, and using a drop in pressure as an indication of the need for more fuel.

For uniformly complete combustion, the fuel and air supply must be correctly proportioned to each other and both must be in proportion to changes in loads. It is, of course, entirely possible to regulate the gas fires to a boiler by hand control for a short period of operation, but for every day commercial operation few plants could afford the expense if good boiler control is to be maintained, as it would require the constant attention of one man.

There are many different types of apparatus for automatically controlling the fuel and air supply in proportion to the load demand on the boiler; all of them have considerable merit and unquestionably can show a saving over hand control.

The simplest combustion control is the direct operated boiler gas fuel governor which has been marketed for a number of years, in both the lever and weight and the spring controlled type. This regulator is installed with the valve body in the gas line leading to the burners and the boiler pressure is connected directly to the diaphragm. As the boiler pressure drops, the force on the diaphragm is decreased and the springs which were under compression cause the valve to open, admitting more gas, increasing the fire, and tending to raise the boiler pressure.

A similar type of control instead of being direct operated, utilizes the boiler steam pressure as an operating medium through a pilot valve, which in turn operates the main diaphragm gas control valve. By means of the pilot, it is possible for this controller to maintain the boiler pressure more accurately than the direct operated type.

A modification of this consists of utilizing the pilot operated type of boiler gas fuel governor, and synchronizing it with a separate diaphragm motor for the operation of louver doors, controlling the air supply to the burners, and thus facilitating better combustion in the fire box.

Another type of governor for this service is one using an outside operating medium such as compressed air or gas, operating through a pilot valve to control the main diaphragm valve. With this control, a pilot valve which utilizes air or gas is mounted in the case of the upper diaphragm assembly. Gas, of approximately 25 pounds or higher pressure, can be taken from the upstream system and used as the operating medium. A unit of this type uses approximately 10 to 15 cubic feet of gas per hour through the pilot mechanism, and the bleed gas can be carried to the boiler and burned in the fire box. This is the most sensitive type of boiler gas fuel control and is equipped with a lever on the top work construction, suitable for operating louver doors, as shown in Fig. 1. It will be noted that a flexible cable is connected from the lever of the controller, which leads to the lever on the louver doors at the burners.

The foregoing are the more simplified types of combustion controls for use with gas fired boilers. From these emanate a wide variety of more complicated types such as the draft regulators, that operate dampers in the stack breeching, blowers, or high pressure air. This draft type of regulator must, of course, be used in conjunction with some type of a steam pressure control regulator, such as those described previously.

In addition to the direct saving afforded by combustion control through the increase of efficiency in the boiler, there are many other savings which contribute to the final picture. A good automatic control in the boiler room will eliminate part of the attention of the boiler room attendant, thus giving him free time to perform other duties. At the same time, the maintaining of a constant boiler pressure at all times means an improved product from a process plant and acts as a general plant efficiency increaser regardless of the type of the product being manufactured or produced.

TABLE NO. 1. SUMMARY OF POSSIBLE HEAT SAVINGS—TYPICAL HOUSE.

	First Cost Gross Dollars	Savings B.t.u. Maximum Hour	Savings B.t.u. Per Degree per Day	Saving Per Cent of Total Maximum Hour	Saving Per Cent of Total Per Degree per Day	Saving In Htg. Plant Cost Dollars	Net First Cost Dollars	Gross Annual Saving Operating Cost	Annual Depreciation Operating Expense Dollars	Annual Operating Saving Dollars	Return on Net Investment Per Cent	In House Already Built with No Saving in Htg. Plant: First Cost Dollars	In House Already Built with No Saving in Htg. Plant: Return on Gross Cost Per Cent
Clock on Thermostat	$ 20.00				7.5		$20.00	$16.03	$ 2.40	$13.65	68.	$ 20.00	68.
Weatherstripping	100.00	12,740	672	11.8	1.6	$ 69.00	31.00	4.40	0.00	4.40	14.	120.00	3.7
Double Windows and Storm Doors	100.00	25,368	4,982	23.6	12.1	121.00	21.00	35.25	13.00	22.25		120.00	18.5
Insulation in Walls No. 1	196.00	22,540	7,728	21.	18.9	107.00	89.00	51.14	0.00	51.14	57.	260.00	19.6
Insulation in Walls No. 2	130.00	12,810	4,490	12.	14.0	61.00	69.00	30.00	0.00	30.00	43.5		
Insulation in Roof No. 1	86.00	10,584	3,629	10.6	11.2	51.00	35.00	24.00	0.00	24.00	68.6	115.00	20.9
Insulation in Roof No. 2	57.50	6,050	2,073	5.6	6.4	30.00	27.50	14.00	0.00	14.00	51.0		

Insulation No. 1—4 in. rock wool—cost if placed when house is built 12 cents per sq. ft. Cost if blown in later 16 cents per sq. ft. Conductance .27 B.t.u. per sq. ft. per degree per in.

Insulation No. 2—A board insulation 1 in. thick, used as plaster base costing 8 cents per sq. ft., installed after deducting for common lath base replaced by it. Conductance .34 B.t.u. per sq. ft. per degree per in.

The Economics of Heat Conservation in Gas-Heated Buildings

● American Gas Association Interim Bulletin No. 26, prepared by House Heating and Air Conditioning Subcommittee; Thompson King, Consolidated Gas Electric Light and Power Co., Baltimore, Md., chairman; issued 1935—(Abstract by WESTERN GAS).

THE heat loss from any structure may be divided into losses due to heat conduction and radiation and losses due to air change. The first may be reduced as far as practicable, but a certain amount of air change is necessary to health and comfort and therefore air change losses cannot be reduced beyond a definite point even if it were possible. The more important measures for heat conservation fall under the following heads:

Reduction of inside temperatures; insulation; weatherstripping and caulking; double windows; reduction of air flow up flues and from open fireplaces.

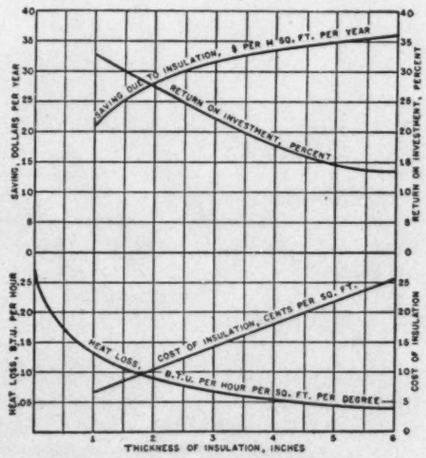

SAVING DUE TO INSULATION, $ PER M SQ. FT. PER YEAR
RETURN ON INVESTMENT, PERCENT
COST OF INSULATION, CENTS PER SQ. FT.
HEAT LOSS, B.T.U. PER HOUR PER SQ. FT. PER DEGREE
SAVING, DOLLARS PER YEAR
RETURN ON INVESTMENT, PERCENT
HEAT LOSS, B.T.U. PER HOUR
COST OF INSULATION
THICKNESS OF INSULATION, INCHES

FIG. 1. Data for Insulation of Varying Thickness (Fuel 10 cents per therm. Fuel efficiency 70 per cent. Degree days 4,500 per season).

A typical house is selected for consideration, of fairly good frame construction, shingle or clapboard outside, slate roof, with unfurnished and unheated attic. Horizontal cross section 30 by 24 feet inside, ceiling height first floor 9 feet, second floor 8 feet. Total contents not including basement or attic 12,960 cubic feet. Uninsulated, with double hung sash windows, single glass, not weatherstripped.

Table No. 1 shows the cost of various conservation measures, both gross and net, the saving in heat, the saving in operating costs and the return on the gross and net costs, assuming the house to be heated by a gas boiler using gas costing 10 cents per therm, with 4,500 degree days.

The thermostat clock is used to set the temperature back at night 10 to 12 degrees and, yielding 68 per cent saving on the investment, is proportionately the most effective conservation measure. Weatherstripping is most effective during periods of high wind velocity, and therefore has considerable control over the maximum hour heat requirements and consequently the size of the heating plant; it reduces the initial investment more than the operating costs. Double windows and storm doors are not in general use throughout the country except in the very cold regions, because of manipulation and upkeep; even after allowance has been made for this latter, however, they are very important and efficient conservation measures.

Insulation is considered by most heating authorities as the most important of heat-saving methods. Many varieties and thicknesses may be used. In addition to the typical data shown in Table No. 1, the savings of heat loss and fuel for various thicknesses of insulation are shown in Fig. 1. It should be remembered, however, that in many cases the thickness of the insulation is governed by other than purely economical considerations, as in many cases it is necessary to fill a given thickness or to spend more in confining it than the cost of filling the additional space. While the effect of insulation on summer house temperature does not bear directly on gas heating, it requires consideration because its performance in keeping heat out is a very strong incentive toward its purchase.

The flow of air from the cellar through the draft hood of the furnace and up the chimney may cause a considerable heat loss, which may be avoided by restricting the opening within safe limits. Unused open fireplaces and other connections to chimneys should be closed, either permanently or with a tight-fitting damper, to avoid losses that, in the case of a flue 8 by 12 inches, and 30 feet high, may be in the neighborhood of 120 therms per season.

Southern Union Gas Co. 16-Day "Christmas Bonus" Campaign

Southern Union Gas Co., headquartering in Dallas, totaled some $19,500 in appliance sales in a "Christmas Bonus" campaign which ran from December 6 to 21. In addition, 118 new meters were connected and 57 reconnections were made. As a result of the success of the 16-day drive, each field employee was awarded a $7.50 Christmas bonus check.

Improvements Planned in Knoxville

Knoxville (Tenn.) Gas Co. plans to spend some $25,000 during 1936 on new construction work and extension of lines in various parts of Knoxville and Fountain City.

Devices of Construction and Operation

● SELECTED from Pacific Coast Gas Association Subcommittee Report on Devices, Contrivances and Novelties of Construction and Operation; Otto Goldkamp, San Diego Consolidated Gas and Electric Co., Chairman. (Following devices described by Allan Larry, Los Angeles Gas and Electric Corp., subcommittee member.)

FIG .1.

FIG. 2.

HAND BORING MACHINE

A hand boring machine for service, or small main, installations is shown in Fig. 1. This machine may be used for dry boring, or used with water pressure. Two men are required for its operation. Bores may be made at the average rate of 3 lineal feet per minute, depending upon soil conditions. A fish-tail bit is used with this device, and ¾-inch pipe as the drill shaft medium.

Fig. 2 illustrates the machine in operation, boring for a new service installation. Only four excavations are required for this installation: (1) Opposite meter location; (2) at parkway; (3) at other substructures; and (4) at the gas main. Unless bit strikes an obstruction, such as a large rock, or root, very accurate bores may be made. Grade and direction of bit are obtained by using two sight staffs which are placed on top of drill shafts.

WELDING PIN CLAMP

Fig. 3 shows a pin clamp for use in clamp removals from steel mains. The clamp is installed by placing chain around main and fastening to hand screw hooks. Hand screw is then tightened, securing clamp to main. Adjustment to pin is made by turning sleeve on top of clamp. This type of clamp prevents side movement or pivoting of pin caused by welding of fitting around pin to the main.

TEST PLUG CLAMP

A device for use with test plugs is shown in Fig. 4. After test plug is inserted into end of pipe, clamp is placed over end of pipe, and set-screws tightened. Each set-screw is equipped with a steel jaw, similar to a jaw of a pipe wrench. The test plug is then pulled back against clamp, and expanded.

TEST PLUG AND GAUGE HOLDER

Fig. 5 shows a combination test plug and gauge holder. It is installed as one unit, which consists of an expansion plug, hose connection, and pressure gauge. It is easily installed or removed by turning barrel affecting plug. Each holder is supplied with rubber plugs for pipes from ¾-inch to 2-inch inclusive.

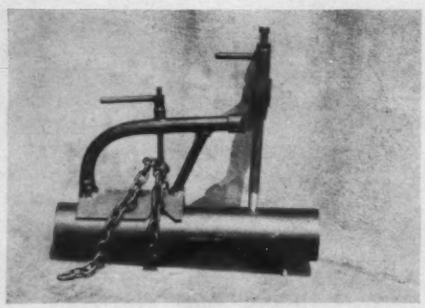


FIG. 3.

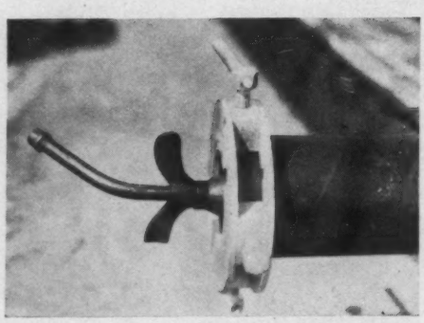


FIG. 4.

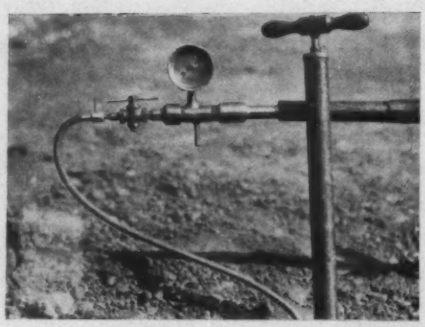


FIG. 5.

Mystery Chef Radio Campaign Off to Good Start

REGIONAL Advertisers, Inc., in charge of the Mystery Chef radio program which a group of eastern gas companies launched early last month, was preparing late in December to distribute initial consignments of the 100-page tie-in recipe booklet to participating companies. "Be an Artist at the Gas Range", as the booklet is entitled, was originally to be printed in a first lot of 300,000, but this has already been raised to 500,000. First delivery to participating companies will be 20 per cent of their order.

Approximately 5,300,000 domestic meters, out of a total of 6,000,000 in the territory covered by the broadcast effort, were under contract by the middle of last month to share in the enterprise.

Community Natural Takes Over Natural Gas & Fuel Co.

Community Natural Gas Co., Dallas, recently acquired the properties of the Natural Gas & Fuel Co., Brownwood, Texas. Since Community Natural already served a portion of Brownwood, the Natural Gas & Fuel Co.'s facilities that are not needed will be reclaimed. The employees of Natural Gas & Fuel Co. have been employed by Community Natural and most of them will remain in Brownwood. No changes in policies or rates are contemplated at present.

A. F. Senior Appointed to New Post

Arthur F. Senior has been appointed field sales representative of the Public Service Co. of Northern Illinois, to be effective December 4. Mr. Senior will cooperate in the promotion of sales in addition to directing the work of the "More and Better Business" organization, which post he has held in the past. In the new work he will coordinate the effort of the salesmen with the sales and advertising plans of the company.

Gas Flow Study Published

"Flow of Natural Gas through High Pressure Lines," recently published, is the title of U. S. Bureau of Mines Monograph 6, by T. W. Johnson and W. B. Berwald of the Bureau of Mines. The Monograph contains 120 pages and 25 figures, and treats of pipe line flow formulae, analysis of flow data, coefficients of friction, corrosion, and related problems.

Domestic Air Conditioning Requirements

● JOHN W. NORRIS, Lennox Furnace Co., Marshalltown, Iowa; addressing Mid-West Gas School and Conference, Iowa State College, Ames; November, 1935—(Abstract by WESTERN GAS).

BY proper and complete conditioning is implied the provision of air that is constantly moving, is at the right temperature and humidity, is clean, and free from objectionable odors. While air cooling is the phase that most frequently comes to mind when conditioning is mentioned, it is the least important in domestic applications as the period during which a house must be heated is far greater than that during which it must be cooled; cooling equipment is costly and the market for it very limited.

During the heating season the air from outside is cold and when heated becomes very dry so that humidification is desirable. While the ideal relative humidity is approximately 45 per cent it is not usually possible to maintain it this high. It has been found that, with single windows in zero weather, condensation will begin to appear on the windows at an inside relative humidity of 17 per cent. With sealed double windows in zero weather the humidity can be raised to 31 per cent before interior accumulation of moisture. Mere storm windows are almost equivalent to single windows because of leakage between them. In average practice, therefore, 30 to 35 per cent humidity should be maintained.

If humidification is done by re-circulated washing, or spraying, and the water contains any quantity of soluble salts, these will be carried by the air as dust and deposited through the house. The remedy for this is to pass the water through a water heater maintained at about 150° F., wherein the salts will be precipitated.

It is good practice to take a portion of the air supply to the blower from out-of-doors. This builds up a slight internal pressure which counteracts infiltration through walls and openings, with its accompanying dirt. The average infiltration, or movement of outside air into and through a closed house, is one air-change per hour, and it is better to intentionally draw in this amount and clean it.

Filtering or cleaning media, with sufficient capacity to need renewing only once a year, will only remove between 85 and 90 per cent of the foreign matter in the air, so that the filtered air will soil a clean white cloth if held in the air stream long enough. Housewives should not be told, therefore, that after the installation of air conditioning housecleaning will be unnecessary.

One surprising result of air conditioning is the relief afforded to hay fever sufferers of the "pollen type". Filters actually remove over 95 per cent of the pollens in the air and, as 95 per cent of the hay fever victims are affected by pollen, the percentage finding relief is very high. Even though in the conditioned atmosphere only part of the time, the chronic sufferer is able to build up considerable resistance to carry him through the exposure periods.

The calculation of cooling loads is very different from that of heating loads, because of such considerations as direct sunshine, which may heat a roof or wall as high as 140° even though the air temperature is only 95°. In residences a very rough approximation is that the cooling load is 20 to 25 per cent of the 0° to 70° winter heating load, and that an average residence will figure a heat load of 80,000 B.t.u., which would mean a 20,000 B.t.u. cooling load or about a 2-ton ice machine.

"Master Load-Builder" Campaign to Continue in 1936

THE "Master Load Builders" campaign of the Iowa Electric Light and Power Co. and the Northwestern Light and Power Co. in 1935 paid $9,913 in cash bonuses to 389 employees for appliance prospects. The activity was inaugurated two years ago and was set up for a two-year period which expired December 15, 1935. Due to the success of the project, it has been decided to continue it in 1936 with minor changes in the compensation scale.

All line employees other than salesmen participate in the campaign. Prospect cards are filled out by the employees and are turned over to a Load Building Chairman, reporting directly to the division manager. Both cash bonuses and Master Load Builder points are awarded on completion of the sale on the basis of the load building potentialities of the appliance. A cash award is paid at the time the sale is made and the bonus on accumulated Master Load Builder points is paid twice annually on June 15 and December 15.

Load Builder Points are redeemed at one third cent each. A total of 2400 points for any six-month period entitles the employee to membership in a Master Load Builders Club and a suitable badge is bestowed. An accumulation of 4,800 points in any six-month period qualifies the employee as a Super Load Builder and makes him eligible to attend a banquet given by the vice-president.

On sales prospects that are turned over to dealers and completed by them, the employee is awarded 50 per cent of the bonus and points awarded for sales completed by company salesmen. The following table gives the scale of awards for 1936 for gas appliance sales closed by company salesmen that result from employee prospects in the Master Load Builders campaign:

	BONUS POINTS	
	For Cash Award	For Master Load B'ld'rs Club
Heaters (Radiant Fire)	$ .50	50
House Heating (Sold)	3.00	1500
House Heating (Rental)	1.00	900
Incinerators	.50	50
Industrial Appliances	As Estimated	
Ranges (New)	3.00	600
Ranges (Replacement)	2.00	300
Refrigerators	3.00	600
Water Heaters (Tank)	.50	100
Water Heaters (Storage)	3.00	600
Water Heaters (Instantaneous)	2.00	500
Water Heaters (Storage, Rental)	.50	150

Home Service Committee to Hold Regional Meetings

THE Home Service Committee of the Commercial Section of the American Gas Association on January 31 and February 1 will hold a home service conference in the home service auditorium of the Consolidated Gas Co. of New York. This conference will supplement the half-day home service programs to be held at the three A. G. A. Regional Sales Conferences according to the following schedule:

Eastern Natural Gas Sales Conference, Pittsburgh, Pa.; home service program on the morning of February 8—Hulda Ungericht, the Ohio Fuel Gas Co., Columbus, Ohio, chairman.

Mid-West Regional Sales Conference, Chicago; home service program on the morning of February 15—Irene Hickey, Detroit (Mich.) City Gas Co., chairman.

Southern-Southwestern Regional Gas Sales Conference, New Orleans; home service program on the morning of February 22—Albertine Berry, Lone Star Gas Co., Dallas, chairman.

A fourth home service conference will be held on February 14 in connection with the sessions of the New England Gas Association Convention, Boston, Mass., with Margaret Fossett, Boston (Mass.) Consolidated Gas Co., as chairman. At all these conferences home service cooperation in the A. G. A. sales campaigns will be stressed, according to Beatrice Cole Wagner, of the Philadelphia (Pa.) Gas Works Co., who is chairman of the A. G. A. Home Service Committee.

Ideas for Film Shorts Wanted

The Alexander Film Co., film merchandising company of Colorado Springs, Colo., announces that it will pay scenario rates for ideas adaptable to short sound films that are contributed by gas range dealers. The company specializes in commercial and promotional films.

TABLE NO. 1. APPLIANCE SATURATION ON P. G. AND E. SYSTEM, PROJECTED FROM 218,262 DOMESTIC SURVEYS

Appliance	Total No. of Appliances Now in Use	No. of Customers Not Using	Present Saturation %
Ranges	304,377	66,517	82.1
Water heaters (Auto.)	152,544	51,530	41.1
(Non-auto.)	167,120		45.1
Central furnaces and boilers	61,342	41,304*	16.5
Floor furnaces, circulators, and miscellaneous	99,987 (Homes using)	98,383 (Homes not using)	27.0

* Coal, wood, and oil users, as shown by survey.

Consumer Survey Yielding Invaluable Market Data

BEGINNING early in 1934, the Pacific Gas and Electric Co. has had in progress a comprehensive survey of existing consumers' gas and electric equipment, made by territorial sales representatives. General details of the survey procedure were outlined in *Western Gas* for May, 1935, in an article by F. U. Naylor of the P. G. and E. A minimum of 25 surveys each week is required of each salesman, for which he receives $20 monthly in addition to his base salary and commission earned on sales.

To date about 250,000 surveys have been completed, and 200,000 remain to be made, which the company's sales department estimates will require another year and a half. As the survey is laid out as a continuous enterprise, some sections have already been finished, and in these the salesmen are on their second survey rounds.

Prospects uncovered by the surveys are farmed out to dealers and to company salesmen, and followed up under a plan of close supervision.

Some of the market findings thus far in the survey are of great interest. Using the first 218,262 domestic surveys for a basis from which to project system-wide totals, the company has estimated the number of gas appliances in use, and percentages of present saturation, as shown in Table No. 1.

Commercial and industrial surveys began the first of 1935, and the first six months saw 10,058 of them completed. From this number 1,583 active prospects for gas resulted. Present industrial gas users and plants employing other fuels, as shown from the original 10,058 surveys, are given in Table No. 2, for the principal industrial classifications.

TABLE NO. 2. INDUSTRIAL GAS CONSUMERS AND USERS OF OTHER FUELS (From First 10,058 Plants Surveyed on P. G. and E. System)

	Gas	Other Fuels
Building Heating		
Central plants	837	977
Room or unit heaters	1,880	1,534
Commercial Cooking		
No. of installations	1,216	162
Commercial Baking	263	111
Industrial Heating		
Boiler fuel	783	287
Kilns	124	50

Gas Service Co. Appliance Drives Yield Results

DURING a 10-day Thanksgiving gas range campaign conducted by the new business departments of the Gas Service Co., 734 ranges were sold. This figure is 100 more than the total for the same campaign in 1934. The total value of all gas appliances sold and rented in October and November throughout the system was $640,000.

A house heating rental plan drive from August 1 to November 16 resulted in 6,636 orders for heating equipment, consisting of 2,111 conversion burners, 3,549 space heaters, 282 unit heaters and 694 furnaces and boilers.

L. D. Reynolds Appointed Purchasing Agent

L. D. Reynolds who has been acting purchasing agent of tthe Public Service Co. of Northern Illinois, has been appointed purchasing agent of the company.

Foreign Holiday Foods Make Effective Window Display

Famous holiday dishes of foreign countries constituted the subject matter of the Kansas City (Mo.) Gas Co.'s display window for the Christmas season. The recipes were collected and the foods prepared for the exhibit by Miss Lulu Tregoning, home service director. Menus containing recipes of foreign dishes were printed for distribution from the sales floor. This display is said to have attracted more attention than any other window display of the Kansas City Gas Co.

George M. Newman Passes Away

George M. Newman, manager of the Albany district of the Portland (Ore.) Gas & Coke Co., passed away December 15. Mr. Newman had been with the company since 1930.

David H. Gowans, Jr., sales representative in the company's Oregon City district, has been appointed to succeed Mr. Newman.

J. S. Arnold Appointed Residential Sales Manager for United

J. S. ARNOLD, formerly sales manager of the Central Arizona district of the Arizona Light and Power Co., Phoenix, has joined the staff of United Gas Public Service Co. at its general offices in Houston, Texas. He will be in charge of residential sales in the Texas, Mississippi and Louisiana territories served by the company.

J. S. ARNOLD

When Mr. Arnold entered the service of the Arizona Light and Power Co. in 1926, he was director of advertising, sales promotion and public relations. For a number of years he was secretary for the Arizona Utilities Association.

John Fremont of B. C. Electric Claimed by Death

JOHN FREMONT

JOHN Fremont, sales manager of the gas department of the British Columbia Electric Railway Co., Ltd., Vancouver, B. C., passed away on December 3. Mr. Fremont joined the company as a trouble shooter in the gas department in 1916 and became sales manager of the department in 1922.

He was well known to members of the gas industry on the Pacific Coast and for several years took active part in the affairs of both the Pacific Coast Gas Association and the Canadian Gas Association.

Federal Water Service Corp. Takes Control of Southern Gas Corp.

Assets of the Southern Gas Corp., in receivership since September, 30, 1931, have been transferred to a new company known as the Southern Natural Gas Co., according to late news reports. Control of the new company passes into the hands of the Federal Water Service Corp., since Federal owns 58 per cent of its Class A voting stock.

Christopher T. Chenery, president of Federal Water Service Corp., is to be board chairman of the new company, and James H. White is to be elected president.

Hewlings of Victoria Gas Co. Passes Away

F. H. Hewlings, until 1932 superintendent of the Victoria (B. C.) Gas Co., Ltd., passed away on November 20. Mr. Hewlings first entered the gas industry in 1885 in the service of the old Victoria Gas Co. In 1905, when the company was taken over by the British Columbia Electric Railway Co., he became superintendent, which post he held until his retirement in October 1932.

Columbia Gas & Electric Corp. Announces Executive Changes

COLUMBIA Gas & Electric Corp. announces the following executive changes, effective December 1: G. W. Ratcliffe, president of the Pittsburgh, Pa., group and assistant treasurer of the corporation, has retired. He is succeeded by C. E. Bennett, president of the Binghampton group of companies. I. K. Peck, assistant vice-president of the Boston Consolidated Gas Co., assumes Mr. Bennett's former post.

Mr. Ratcliffe was chairman of the Natural Gas Department of the A.G.A. in 1932-33. He is wintering on the Pacific Coast with his son, G. L. Ratcliffe, who was formerly with the General Petroleum Corp. and is now general manager of the Baroid Co., Los Angeles. Mr. Bennett is chairman of the A.G.A. Commercial Section for the current year. Mr. Peck is a past chairman of the Technical Section and is a member of the A.G.A. Advisory Council.

"Detroit Plan" Endorsed; No Rental Asked on City Streets

ON December 17 the City Concil of Detroit unanimously endorsed the "Detroit Plan," described in detail elsewhere in this issue, setting up a new rate standard and paving the way for introduction of natural gas to the city. Natural gas is expected in Detroit about July 1 of this year. Terms of the "Detroit Plan" agreement between the city and the Detroit City Gas Co. were put into effect by incorporating them in a consent decree approved last month in the Michigan circuit court. This action formally ends the rate case pending between city and gas company.

Further action taken last month by the Detroit City Council in composing differences with the gas company has resulted in suspending the suit pending in Federal Court before Judge J. Moinet by which the city sought to collect $1,500,000 annually for use of city streets for gas mains.

S. F. Hayward, Connelly Board Chairman, Passes

S. F. Hayward, chairman of the board of Connelly Iron Sponge and Governor Co., died December 7 at the age of 89 in his home in East Orange, N. J. Mr. Hayward began his career in the fire extinguisher business. Some 47 years ago he sold these interests to become a prime factor in the organization of the Connelly Brothers Co. into the Connelly Iron Sponge and Governor Co., serving as secretary and treasurer for 35 years, as president for 10 years and as chairman of the board since 1933.

Mr. Hayward is survived by Mrs. Hayward, two sons and two daughters.

"Quality Prospects" Produce Good Results

More than five thousand prospects were turned in by employees of the Peoples Gas Light and Coke Co. in a "Quality Prospect" campaign that was brought to a close in December. Eight hundred and eighty-eight actual sales were made from the prospects which were turned in by 3,679 employees.

Several Natural Gas Lines Now Pending in Michigan

MICHIGAN Public Utilities Commission gave formal approval to the Consumers Power Co. on December 4 to start construction work on a $400,000 gas project, later amended to $507,000 when it was decided to increase the dimension of the pipe to be used from 8⅝-inch to 10-inch. The line will originate in the Hinton-Millbrook-Belvidere gas fields in Mecosta and Montcalm counties and will carry gas to Lansing and 25 neighboring communities.

The principal towns to be served under the plan, in addition to Lansing, are East Lansing, Okemos, Williamston, Webberville, Fowlerville, Haslett, Lake Chemung, Lake Lansing, Howell, Brighton, Holt, Mason, Leslie, Eaton Rapids, Charlotte, Portland, Ionia, Lunfield, Mullikin, Woodland, Woodbury, Grand Lodge, Lake Odessa, Vermontville, Nashville and Hastings.

The formal approval granted by the Commission has been protested by some of the major cities involved, with the City Council of Lansing demanding that the approval be withheld until it was known what rates Consumers Power proposes to charge. Also farmers representing the producers in the field have protested the move.

Two applications are pending before the Commission for permission to construct a gas line to Grand Rapids, calling upon the same gas fields as that from which the Lansing line is to get its supply. The Grand Rapids Gas Light Co., which now distributes manufactured gas in that city, also has started to contract for gas rights in the field, hoping to obtain a pipe line permit of its own to transport natural gas to the city.

Governor Frank V. Fitzgerald of the State of Michigan was authorized by the State Administrative Board in November to select an engineering firm to make an impartial survey of the resources of the Michigan fields to determine whether the supply of gas was sufficient to justify the latest proposals for gas lines.

The Bureau of Mines has been called in on this investigation, and has sent E. L. Rawlins and M. A. Schellhardt, of the Petroluem Experiment Station at Bartlesville, to have charge of this survey. Three or four months are expected to be consumed in making the appraisal.

The Lansing line would be 60 miles in length and would serve approximately 25,000 meters in the Lansing district.

1935 Statistics Show Gas Customers at All-Time Peak

IN 1935 the United States gas industry continued the improvement which began during the preceding year, according to year-end statistics released by the American Gas Association.

A statement from Alexander Forward, managing director of the A.G.A., reveals that last year manufactured and natural gas companies, supplying towns and cities with an aggregate population of 80,000,000, served a total of 16,002,000 customers, representing the largest number of consumers ever connected to the mains of the industry. Of these, 9,973,000 were served by the manufactured gas industry and 6,029,000 were served by the natural gas industry.

Revenues of the entire industry, both manufactured and natural, totaled $726,306,000, a gain of 3.4 per cent over the preceding year of 1934. The natural gas companies grossed $353,335,000, a gain of 7.8 per cent for the year, while revenues of the manufactured gas companies were $372,971,000, as compared with $374,845,000 in 1934, a decline of .5 per cent.

Sales of manufactured gas for domestic uses, other than house heating, such as cooking, refrigeration, water heating, amounted to 225,884,000,000 cu. ft., a decline of 3 per cent for the year. House heating sales, however, registered a gain of 29 per cent. On the other hand, the sales of natural gas for domestic uses registered a pronounced upturn rising from 284,482,000,000 cu. ft. in 1934 to 302,120,000,000 cu. ft. in 1935, a gain of 6.2 per cent.

Sales of both manufactured and natural gas for industrial and commercial purposes in 1935 averaged about 10 per cent above the previous year.

Sales of gas ranges in 1935 continued at a pronounced upward trend. Approximately 1,100,000 gas ranges were sold during the year, representing a gain of about 250,000 or nearly 30 per cent over 1934. It is interesting to note that nearly 15 per cent of these sales constitute relatively high priced ranges incorporating modern automatic features, such as oven heat control.

Rate Reduction Plan Announced in Southern California

IN the territories served by the three Southern California gas companies which headquarter at Los Angeles (the Los Angeles Gas and Electric Corp., Southern California Gas Co. and Southern Counties Gas Co.) a 15 per cent gas rate reduction will become effective as of the February 15, 1936, meter reading, for customers who can qualify under terms of the new schedule. The reduction is applicable only to domestic and commercial consumers that (1) use a gas range having not less than four top burners and one oven for their principal cooking requirements, that (2) use an automatically operated gas water heater or heaters for all their water heating, and that (3) use gas appliances with an aggregate hourly input capacity of not less than 25,000 B.t.u. for their principal building heating requirements. All three conditions must be met to qualify under the schedule.

The new rate provides for a 15 per cent discount on that portion of the monthly billing

between $2 and $25, billed under the general service schedule. Early in January the companies will begin sending combination contract and survey forms to their customers on which they may apply for the new rate, and also list all gas appliances in the home, the list being subject to approval by the company before the customer is eligible for the discount. In addition to serving its purpose for the new billing set-up, this list will constitute an excellent survey for future new business promotion.

In apartment houses using individual meters, each meter will be entitled to the discount, including cases where the management provides hot water and space heating service, so long as gas is used for the three purposes specified.

The annual benefit to gas consumers is estimated at approximately $1,250,000. The new schedule affects all territories served by the three companies with the exception of the San Joaquin Valley Division of the Southern California Gas Co. where a similar inducement rate was instituted on July 4, 1935.

In a joint statement announcing the new rate, Addison B. Day, president of the Los Angeles Gas and Electric Corp., A. B. Macbeth, president of the Southern California Gas Co., and F. S. Wade, president of Southern Counties Gas Co., pointed out that the trend of gas rates in Southern California has for many years been constantly downward, rates now being 32 per cent below the 1913 level, while general costs of living in the country as a whole have increased over 38 per cent during the same period.

National Water Heater Contest Plans Announced

THE Gas Water Heater Division of the Association of Gas Appliance and Equipment Manufacturers in cooperation with the Water Heating Committee of the A.G.A., together have set aside $100,000 for promoting the 1936 gas water heater contest to be called "The Clean-Up Campaign." The contest will run for eight months and will be aimed at a 300,000 unit quota. The campaign plan contemplates a complete sales promotion program consisting of newspaper helps, direct-mail helps of various kinds, billboard advertising suggestions, window and floor display suggestions, a rotogravure newspaper on hot water news, a complete work plan for conducting local water heater drives, a home service program for home service department hook-up and a monthly house organ to go out from water heater headquarters for eight months publishing facts, figures, information, pep stories, etc., on the contest as it proceeds.

For contest purposes companies will be classified as follows: Division 1, companies having 100,000 or more domestic meters; Division 2, those having 100,000 to 50,000 meters; Division 3, 50,000 to 10,000 meters; Division 4, 10,000 to 4,000 meters; Division 5, companies having less than 4,000 meters. Companies are further classified into groups 1, 2 and 3 on the basis of net rates per therm. Prizes of $100, $75 and $50 will be awarded to the three highest ranking salesmen respectively in each division for the entire eight-month period. Six prizes ranging from $300 to $25 will be awarded to the six highest ranking companies in each division for the entire contest for distribution to salesmen and dealers.

The same scale of company cash awards will apply to an intensive two-month campaign, the dates of which are to be selected by each company. Contestants may begin the eight-month drive on either January 1 or February 1, 1936; and the two-month intensive drive must fall sometime within the eight-month period. In addition to the other awards, every month $10 will be awarded to each of the eight salesmen having the highest number of sales points for the month in each division. A bronze medal will accompany the cash awards. Three-time winners will be presented with a special silver medal. The eight salesmen in each division making the best record for the entire contest will be awarded a gold medal.

Gas companies will be charged an entry fee for the contest as follows: Division 1, $20; Division 2, $15; Division 3, $10; Division 4, $5; and Division 5, $3.

1935 Electrolux Sales Top 1934 by 56 Per Cent

According to F. E. Sellman, vice-president in charge of distribution of Servel, Inc., 1935 Electrolux sales exceeded 1934 sales by 56 per cent. Factory shipments for the period from November 1 to December 15, 1935, were greater than the total shipments for November, December and January a year ago. The company's 1936 promotional plans include advertising in newspapers, nationally read magazines, farm journals, trade periodicals and radio programs.

Ft. Meyers New Appliance Department

City of Fort Meyers, Florida, Department of Water and Gas recently opened a new appliance department under the supervision of Carleton Van Dervoort. An active merchandising program has been planned which includes newspaper advertisements, demonstrations, displays and cooperative arrangements with theatres.

Grover Appointed Adv. Mgr. of Surface Combustion Corp.

W. J. Grover has been appointed advertising manager of Surface Combustion Corp., according to C. B. Phillips, vice-president. Mr. Grover succeeds D. H. Bacon, who resigned recently to become associated with Ketchum, McLeod and Grove, Inc., advertising agency. For the past two and a half years Mr. Grover has been sales director of the Peoples Gas Light and Coke Co., Chicago.

Oklahoma Natural 1935 Sales

Oklahoma Natural Gas Co., headquartering in Tulsa, as of November 30, 1935, showed a gain of 3,370 meters over the same time the previous year. Appliance sales for the first 11 months of 1935 totaled 281 conversion burners, 340 central gas heating plants, 1,734 floor furnaces, 1,856 Electrolux Refrigerators, 10,070 gas ranges and 2,641 automatic water heaters.

Texas Gas Utilities Co. Distributing Properties Sold

ACCORDING to H. L. Mann, receiver of Texas Gas Utilities Co., headquartering in Del Rio, Texas, the distribution facilities of the company were sold late in November to the Texas Gas Distributing Co. Officers of the distributing company are H. Harper McKee, president, and Harry L. Tower, secretary treasurer, both of the firm Brokaw, Dixon and McKee, consulting engineers. The transaction involves distributing properties in Del Rio, Uvalde, Eagle Pass, Crystal City, Carrizo Springs and La Pryor, Texas.

The receiver for Texas Gas Utilities Co. retains all production and transmission lines and all existing wholesale contracts, and has contracted to supply the Texas Gas Distributing Co.

Several Staff Changes Made By Southern California Gas Co.

H. L. ZIEGLMEYER, formerly district agent in Los Angeles for Southern California Gas Co., has been appointed head of the company's recently formed department on main extensions and customer refunds. R. S. Cheatham, formerly district agent at Glendale, now fills Mr. Zieglmeyer's former post.

Oliver Jacobi, formerly Southern California Gas Co. district agent at San Bernardino, has been transferred to Glendale in the same capacity. W. P. Hand, sales supervisor at Glendale, was appointed district agent at San Bernardino. R. D. MacMahon of the industrial sales department was made sales supervisor in Glendale. R. T. McFadden, of the company's auditing department, has been named district agent for Redlands, succeeding Hugo Tieck who resigned recently.

Public Service Co. Discontinues Rental-Purchase of Heating Equipment

THE rental-purchase plan for selling gas fired space heating equipment, in effect with the Public Service Co. of Northern Illinois since July 19, 1933, has been discontinued as of December 21. Hereafter all space heating equipment except the "Bungalow Package" conversion burners will be sold on a cash or deferred payment plan or on a straight rental basis.

For the 29 months during which the rental-purchase plan was in effect, there has been an increase of 400 per cent in heating installations. On the day that the plan was launched 2,246 gas-fired heating installations were made. On November 30 of this year the number had increased to 10,785.

Raleigh Gas Co. Promotions

Kenneth O. Dupree, formerly sales manager of the Raleigh Gas Co., Raleigh, N. C., has been made assistant manager in charge of operations for the company. Mr. Dupree began his service in the gas industry as bill clerk in 1910 for the Carolina Power & Light Co. prior to the purchase of its Raleigh properties by the Raleigh Gas Co.

Mr. Dupree's former post is filled by W. B. Lumsden who was also formerly with the Carolina Power & Light Co.

THE EYES of the gas industry are on the second great Gas Range Derby, sponsored by the A. G. A.'s Domestic Range Committee. A purse of $12,000.00 and a purpose whose value cannot be measured in dollars.

In last year's event, two of the three prizes in Division I (the big city group) went to companies which featured Estate Ranges in their campaigns. And again this year, the betting odds will favor those companies which concentrate on the new, super-smart, more-than-modern Estate.

Look at the picture and you'll see the champion of champions—sensational new appearance and a long list of features designed to make women dissatisfied with their un-modern cooking equipment.

This year, more than ever before, it will pay to

CONCENTRATE ON ESTATE

THE ESTATE STOVE COMPANY, Hamilton, Ohio

Warehouse stocks in Los Angeles, San Francisco, Portland, Minneapolis, Dallas

Gas-fired forging furnace at Columbia Tool Steel Co.'s Chicago Heights plant.

Tool Steel Furnaces Turn to Gas Fuel

RECENT conversion of Columbia Tool Steel Co.'s Chicago Heights plant marks the first installation of a completely controlled gas-fired furnace for tool steel forging. Four furnaces have been converted to gas firing and complete conversion of the plant is in prospect. The installations were made by the Mahr Manufacturing Co., of Minneapolis, under the direction of Robert G. Guthrie, chief metallurgist for the Peoples Gas Light and Coke Co., in whose laboratory the preliminary research for the installation was conducted.

The Columbia installation involved the conversion to gas firing of four furnaces with hearths up to 16 feet in length and 7 feet in depth, with loading capacities up to 20,000 pounds per charge. The insides of the furnaces were re-designed and re-bricked in order to give satisfactory dimensions and conditions for gas firing. Flue vents were installed in place of stacks and fireboxes were bricked over.

Each furnace was equipped with three low-pressure sealed-in burners of special design, each burner having a capacity of 2,100 cu. ft. of 1,000 B.t.u. natural gas per hour mounted in an especially constructed and proportioned combustion chamber. Air is supplied by an individual blower on each furnace.

Control specifications required that each furnace be equipped with two-position gas and air mechanical positive proportioning valves, with mechanical linkage and electrical operation. For this purpose a North America motor operated valve was used.

The control instruments are set on an especially mounted control board close to the furnace and in full sight of the hammer crew, instead of being mounted in some other part of the plant on a central control board. In addition to the usual recording temperature controller, the controls include gas and air regulating valves, a continuous gas analysis recorder for each furnace, furnace pressure gauges and gas pressure regulators.

The crew foreman determines the heating program for any given charge and lays out the 24-hour program on a slate on the instrument panel. A typical program, for instance, will run as follows: 11 p.m. temperature 1,450°; 3 a.m. temperature 1,950°; 5 a.m. temperature 2,300°, against a work starting time of 2,300°. At the hours designated, the night men set the temperature on the recording temperature controllers, and the hammer foreman can satisfy himself, by a glance at the recorder, that his program has been followed and that the material is ready for working.

The practice not only gives accurate temperature control, but makes possible a controlled heating rate with definite starting and finishing maximum and minimum temperatures.

As a result of the controlled furnace atmosphere made possible by the use of gas, decarburization of the surface has been reduced 66.66 per cent, and scaling has been reduced 75 per cent, the scale that comes off at the first hammer-blows being paper-thin. Previous losses, from ingots to finished bars, had run as high as 9.4 per cent.

Greater uniformity of product has resulted from the controlled atmospheres of the new furnaces, and from their freedom from outside variables. Since there is no stack in connection with the furnaces, and therefore no inflow draft around furnace doors, uniform heating of the billets is accomplished.

The factor which makes possible this control is the use of a relatively high positive furnace pressure, making operation of the furnace entirely independent of outside weather conditions. Because of the positive pressure, a curtain of air to protect the workmen is provided by blowers which direct a thin sheet of air upward in front of the furnace doors.

Collateral advantages following conversion to gas firing are improved working conditions for the hammer crew, elimination of smoke, greater cleanliness and more healthful atmosphere. Firing speed has been increased 500 per cent, danger of overheating the work has been reduced to a minimum and under-heating of work has been eliminated. The thermal efficiency of the furnaces has increased approximately 50 per cent in the absence of stack and infiltration losses.

W. G. Hoyt, Consolidated Gas Co. Official, Called By Death

W. GREELEY HOYT, formerly president and director of several units of the Consolidated Gas Co. of New York, died in Pasadena, Calif., on November 24, at the age of 76. Mr. Hoyt had retired from active service with Consolidated on August 1, 1935. At the time of his death he was visiting his son, W. L. Hoyt, Los Angeles manager of the H. R. Basford Co.

The early part of Mr. Hoyt's career was spent in the foreign trade business with Japan and China. In 1894 he entered the service of the Standard Gas Light Co. of the City of New York, becoming secretary-treasurer of the company a few years later, then vice-president, and in 1906 was eleceted president and a member of the board. At the time of his retirement, he was president of Standard Gas Light Co., the New Amsterdam Gas Light Co., East River Gas Co. of Long Island City, and the Municipal Lighting Co., all Consolidated Gas Co. of New York subsidiaries.

Mr. Hoyt was a member of the A. G. A. and of the Illuminating Engineering Society.

Gas Service Co. Begins Year With Intensive Sales Program

Through January and February new business departments of the Gas Service Co. are carrying on a furnace and boiler campaign featuring 5 per cent down with the second payment not due until October 1, 1936. A similar campaign on furnaces held during February, 1935, sold 200 installations, the orders being dated October 1.

F. M. Rosenkrans, new business manager, announces that in each month of 1936 a range special will be featured. For January a Detroit Jewel was selected to be offered at $67.50.

Ward Conducts Furnace Engineering Course

Ward Heater Co., Ltd., Los Angeles, will conduct a "School of Basement Furnace Engineering" for salesmen, dealers and plumbers. The first class will be held 7 to 9 p.m., January 6. Classes will be held Monday, Wednesday and Friday evenings for two or three weeks. Among the subjects that will be covered are figuring new and replacement jobs, furnace controls, installation procedure, forced air heating, etc.

PAY-LOAD

10
RUUD AUTOMATIC AND NON-AUTOMATIC TYPES WILL HELP YOU BRING IT
back!

Tank Heaters • Combination Heaters • Conversion Heaters • Low-Speed Storage • Quick-Speed Storage • Faucet-Action • Continuous Flow • Multi-Coil and Many Others

The water heater **pay-load** is on the way back! Gas company effort will rightly be directed to ALL classes of customers,—to match the water heater to the customer's needs and pocket-book,—and by this win back shut-off and part-time meters.

This can be done with the RUUD line of water heaters, ready in ten major types and many sizes to fit every home and building. For 1936;—new models and new improvements with full details on your desk a few days after you mail the coupon below.

RUUD MANUFACTURING COMPANY
Pittsburgh, Pa.

RUUD QUALITY

NAME .....

COMPANY .....

CITY .....

Mail the coupon for full details of the RUUD 1936 line.

T. V. Purcell Retires from Peoples Gas Light and Coke

THEODORE V. Purcell, vice-president in charge of sales of The Peoples Gas Light and Coke Co., resigned his post on January 15 after rounding out a half century in the gas utility industry, 35 years of which have been spent with the Chicago gas company.

T. V. PURCELL

F. X. Mettenet, general sales manager of the Public Service Co. of Indiana and the Northern Indiana Power Co., has been elected vice-president to succeed Mr. Purcell, it was announced by George A. Ranney, chairman of the Peoples company.

Retirement of Mr. Purcell means a loss to the gas industry of one of its leading figures. The Charles A. Munroe Award of the American Gas Association which was conferred upon him in 1931, gave tangible form to the recognition which he had enjoyed throughout the industry for his progressive and sound studies in rate making. He was one of the pioneers in the application of promotional rates, his work in this field having begun many years ago when the industry was being revolutionized by the change from coal gas benches to carbureted water gas generators, the decreased production cost opening the way to sales expansion.

An active participant in the work of the American Gas Association since its organization, Mr. Purcell was chairman of the Rate Structures Committee for two years, and is a member of the Rate Fundamentals Committee as well.

Educated in engineering, Mr. Purcell first went to work for the Equitable Gas Co. of New York, which was later consolidated with the New Amsterdam Co. After holding executive positions with both companies, he went to Chicago in 1901, and has been with the Peoples company since then. He was made secretary of the company in 1917, and vice-president in charge of sales in 1924.

He is credited with having started the first home service department in the gas industry, and the steady growth in importance of this phase of the industry's service to customers owes much to his continued interest. Other innovations which Mr. Purcell promoted at the Peoples company include the service annuity system, a new system of general accounting, and scientific employment and service systems. He was one of the promoters and a charter member of the Peoples Gas Club, one of the largest employee organizations in the gas industry.

Mr. Mettenet comes to the Peoples company after 23 years of experience in the utility field. Graduated from Cornell in 1912, he went to work for the Commonwealth Edison Co. of Chicago, and after three years in the construction department was transferred to the sales department, in which field he has been engaged ever since.

Mr. Mettenet became general sales manager of the Northern Indiana Public Service Co. in 1923, and in 1929 he was made sales manager of the Public Service Co. of Indiana and the Northern Indiana Power Co., the post he resigned to assume his new duties.

THIS issue of WESTERN GAS has the largest distribution of any regular issue we have ever published — exceeded only by our May, 1931, edition which was a special issue. We welcome the 77 new subscribers who are starting with this month's issue.

Gas Exhibit Again Planned for Calif. Pacific International Exposition

GAS will be represented again at the California Pacific International Exposition, when the latter reopens next month in Balboa Park, San Diego, to run until September 9.

San Diego Consolidated Gas and Electric Co. and Southern Counties Gas Co. have engaged the 64- by 30-foot space occupied last year by the combined exhibits of gas companies and the Pacific Coast Gas Association. Plans are being tentatively considered for incorporating in the joint gas company exhibit a small theatre, in which an industry film recently prepared by the gas companies may be shown to fair-goers.

Additional space adjacent to that of the gas company display is being reserved by the Exposition management for use of gas appliance manufacturers, in the event that a sufficient number are interested in exhibiting to make the display representative.

Gate admissions during the 167 days of the last Exposition totaled 4,784,811, without counting the many admitted in groups.

All Gas Wonder House, Grand Rapids, to Open January 5

THE January 1 issue of the Grand Rapids (Michigan) Press features the All Gas Wonder House constructed by the Grand Rapids Gas Light Co. which will be officially opened to the public on January 5.

The house is said to be the first prefabricated steel panel dwelling to be built in Michigan and features gas in every possible installation, including the range, rubbish burner, heating boiler, hot water heater, gas refrigerator, laundry stove, clothes dryer, incinerator and three fire place heaters.

The house was designed by General Houses Inc., of Chicago with Owen-Ames-Kimball Co., of Grand Rapids as general contractor. Glenn R. Chamberlain, president of the Grand Rapids Gas Light Co., supervised the construction of the home.

Gas floodlights have been installed to illuminate the building temporarily. Eventually the home is to be sold.

Mississippi "Chill Chaser" Campaign Results in 5,385 Heater Sales

MISSISSIPPI Power & Light Co.'s annual "Chill Chaser" space heating campaign, which was reported in *Western Gas* for October, 1935, closed in November with a total of 5,385 space heater sales which is 269 per cent of quota.

During the campaign the No. 6245 Peerless Hearth-Frye was featured for $9.95 cash and tax and installation, or 95c down with the balance in 9 monthly payments. Employees turned in prospect cards and were paid 50c for the first heater sale closed and 25c for each additional heater sale to any one individual. For each new meter application turned in directly by an employee $1 was paid. Individual prizes to salesmen ranged from $25 to $5. Newspaper advertising, bill enclosures, pamphlets, posters, rubber stamps and banners were used extensively in the campaign.

Sackman Named General Sales Mgr. No. Indiana Public Service

JAMES C. Sackman, who has been assistant to the general sales manager of the Northern Indiana Public Service Co., on December 10 was named general sales manager by Dean H. Mitchell, vice-president and general manager of the company. Mr. Sackman succeeds C. V. Sorenson, who resigned effective December 14, to become general sales manager of the Citizens Gas and Coke Utility at Indianapolis.

J. C. SACKMAN

Mr. Sackman entered the employ of the Northern Indiana Gas and Electric Co., predecessor of the Northern Indiana Public Service Co., in 1924. He has had wide experience in both the sales and operating branches of the utility business, having served variously at the Indiana By-Product Gas plant as chemist; in the commercial lighting department; at Plymouth in the sales and operation department; at Hobart as a supervisor when the Hobart Light and Water Co. was taken over by the Northern Indiana Public Service Co., and at Gary and Hammond. He was sales supervisor for the Gary Heat, Light & Water Co. prior to the separation of management of that utility and the Northern Indiana Public Service Co. During the three years he served in that capacity, he also was responsible for sales in the Hammond division, which includes Crown Point and other communities. He became assistant to Mr. Sorensen in December of last year.

Prizes Offered for "Cooking Blunders"

Peoples Gas & Electric Co., Mason City, Iowa, attracts attention to its newspaper advertisements by running a box in the advertisement offering $1 each day for the best "cooking blunder" submitted that day. The winning cooking blunders are described in subsequent issues, omitting the name of the winner.

CONSUMATING 72 YEARS OF FINE RANGE BUILDING

We Present the Greatest Achievement In Our Entire History

1936 DETROIT JEWEL

GAS RANGES

At last here is a range that "radiates" beauty but keeps its heat controlled and confined; a range not only styled to awaken desire for ownership but constructed and applianced to intrigue any and every woman who has ever used a cooking range.

Every inch of this range has "selling" power. Its material, quality and construction throughout is the best. Every feature is basic and perfected to not only insure superb cooking results, but to make such results practically automatic and effortless.

Outstanding superiority has been added to the 1936 Detroit Jewel by the introduction of our new "Even-Heat" Flame Spreader; improved Drawer-Type, Smokeless Broiler; improved Oven Insulation, new Top Burner designing.

4 BEAUTIFUL 1936 MODELS

A choice of alluring color combinations and trims are offered. It is the range you will sell and sell at a real profit. Catalog of our entire line now ready. Write for yours.

Detroit Jewel's new Ceramic Radiant Broiler and new Automatic Oven Lighter available for all models at slight additional cost.

DETROIT-MICHIGAN STOVE CO.

Detroit, Michigan

Background Given on the "Detroit Plan"

(Continued from Page 10)

of the books and records of the capital account of this property, have had trained engineers visit and inspect all of the visible elements of property, and have analyzed with great detail the books and accounting records of the company from 1898 to date.

Our approach to an agreed rate of earnings of this company has been realistic rather than theoretical. For the purpose of securing the most effective development of a natural gas market in Detroit, it is necessary that this company should adopt vigorous measures, set high standards, and be financially in position to move rapidly and unhampered to the earliest possible development of a complete natural gas service. It should have good credit and a financial standing that would enable it to secure any needed sums of money advantageously and cheaply.

The other side of the real picture is that the gas itself must be sold to Detroit consumers at the lowest possible prices to secure the full promotional value of low prices in developing a volume of business so large that overhead and investment charges against the service would fall as lightly as possible on each unit of gas handled. Our objective is, therefore, a large volume business by a sound financial company with the minimum selling price.

From our study of the obligations, operating costs and general financial history of this company, it is our conclusion that its financial health and standing would be impaired if, over a period of years, it would show less than the net profit we have set up in this memorandum as the "base earning". This "base earning" is not formulated as any relation to theoretical valuation.

We are using a 7 per cent return on additional property which is to be specifically added in the course of natural gas service as a convenient and definite measure of future additions to the "base earning". This fact does not imply in general an approval of any principle of 7 per cent or any other definite per cent of return on all invested capital for the reasons just given.

It is necessary to admit at this point that a conference for the purpose of etablishing such a "base earning" between representatives of a utility and a city cannot succeed in an atmosphere of bitter controversy and recrimination that so often surrounds such issues. In order to arrive at an agreement, there must be a very high degree of open-minded fairness on the part of the conferees, and a still higher degree of confidence in these representatives by their respective principals.

In such an atmosphere, with the realities considered frankly, and a spirit of fairness and willingness to make reasonable concessions, such a result is possible. The test of its success and propriety is whether, by means of such a finding, it is possible to secure a constructive promotional rate structure.

Dividend

Rate regulations in the past, in general, have not been successful. The mechanical process of preparing cases and hearing them in successive hearings, over a long period of time, and the delay of the commission in handing down decisions, is only a small part of the time delay that usually occurs between the application and the final new rate, because in almost all cases the experience has been that these decisions are appealed to the courts, often in a succession of appeals, and the litigation of these appeals required years. In the meantime, the cases as heard, based on the operating information of the period immediately preceding the time of the original hearing, have become obsolete history, business conditions have changed, and the new rate, when finally adjudicated, is wholly inapplicable to the changed condition. Often the final decision is to remand the case for new evidence, and the whole process has to be gone over a second time, as in recent Supreme Court decisions in Ohio. The cost of this expensive type of controversy is so severe that the public, which must raise the funds by burden of taxation, is justifiably loath to undertake a program of rate litigation.

On the other hand, if a utility company finds itself with a deficient earning the process by which it can secure relief through this same channel is so difficult and so long that it is in danger of falling into serious financial difficulties and possibly disaster before final relief is achieved.

The consumers' dividend of the "Detroit Plan" is designed to effect an automatic, instantaneous adjustment of the earnings between the gas company and the consumer each year, in accordance with current business experience of the year. If conditions are such that, under rate litigation, a reduction of rate might legitimately be requested or demanded, that adjustment will immediately take effect in the form of a cash distribution to consumers directly following the fiscal year in which the excess occurred; while on the other hand, a depression of the earning rate merely effects a corresponding reduction in the current dividend, having no aftermath of instability of rate or burden of either litigation or financial strain on the utility.

The second most important phase of the consumers' dividend is that of incentive. It is a matter of public interest that the utility should have an incentive to continually increase its efficiency of operation and the volume of its business, and decrease its operating expense to a minimum consistent with such efficient operation. Rates based on a formula of a certain amount of money that the utility is entitled to earn for a certain amount of capital investment give no consideration for difference in success or efficiency of operation, give no adequate incentive to the company to reduce its operating expense, but on the contrary, in cases where a property is fully earning its allowed rate, there is a premium for increasing its operating expense as the consumer must pay all of the cost in any case, in addition to the permitted rate of earning. This situation can result in a premium on extravagance.

Where the economic incentives of two partners in any situation are parallel or have a common objective, there is little possibility of controversy, as the natural desire of each party is for the same result; such is the relationship of company and consumers that this dividend seeks to attain. On the other hand, where incentives are in opposite directions, controversy, conflict and the destruction of value are almost inevitable consequences.

On the basis of the "Detroit Plan" of an agreed "base earning" and a division which is shared between the consumers and the company, the company is permitted to increase its own profits as a reward for decreasing the cost to the consumer. An increase in the volume of business, and reduced operating expense achieved by efficiency of operation, both act to increase the earnings available for division between the company and consumer.

It was suggested at one time by the gas company in these discussions that only a certain limited amount of excess earnings be thus divided and that all above that amount should go wholly to the consumer—for instance, that the first step of 50-50 division be followed by all earnings above that being distributed wholly to consumers. It was the writer's position on behalf of the consumers that this would, in a measure, defeat the purpose of the division of earnings, and while it was proper for the major proportion of the further excess earning to go to the consumer, it was of paramount importance to the consumers' interest to maintain an incentive to the gas company to increase its efficiency of operation and the volume of its business without limit.

Formulation of Rates

With regard to the specific rates to be applied to gas sales in Detroit, it is important that these should be as low as possible to secure the greatest promotional effects on the sales. If we were to formulate specifically the precise rates for consumers at this time, the gas company would be compelled to press for a higher rate than we consider ultimately advisable, because of the uncertainty of the amount of gas it will be able to sell to commercial and industrial consumers.

There is a large potential industrial market in the Detroit area which should carry a large part of the burden of the necessary revenue. In the next three or four months a great deal of this gas can be actively committed for sale. It was the writer's recommendation that we withhold the precise formulation of the domestic rates to get the advantage of these commitments and an estimate of commercial and industrial sales, based on experience in getting commitments up to say next May, so that the domestic rates shall be no higher than necessary to supply the additional required earnings.

The frequent reference in all of the statements of the "Detroit Plan" to promotional rates as a general term, without specific mention of a schedule, might indicate an avoidance of the inevitable issue of a rate schedule. This is not, however, the case; the words are used in a very definite sense in this connection.

In a study made in 1932 in connection with ultimate rates for gas service in the City of Chicago, in which Mr. Naiman and the writer were associated, a basis was developed for forecasting the normal amount

It's Modern..to meet modern Competition

● The tremendous acceptance of Magic Chef Series 1400 proves that buying women of today are fully ready for advanced style and up-to-date efficiency in cooking appliances. Other recent models in the complete Magic Chef line all exemplify the modern trend in gas range design, while allowing for wide variation in selective buying.

Modern design and advanced engineering represented by Magic Chef gas ranges backed up by extensive national advertising provide the gas industry with the most effective tools to combat competition of other fuels and maintain the gas cooking load.

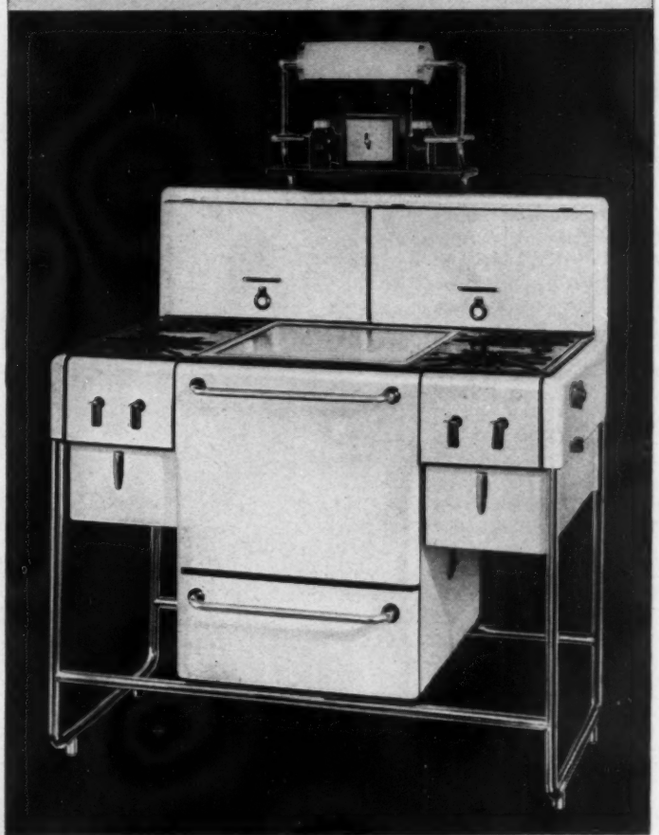
Important as this is to gas companies, it also serves to protect and aid the dealer in unifying and maintaining his profitable gas range business. In giving the housewife everything that modernized cookery can supply, Magic Chef opens for gas companies and dealers the utmost in modern gas range sales.

LOOK FOR THE RED WHEEL WHEN YOU BUY A MAGIC CHEF

AMERICAN STOVE COMPANY
BOSTON • NEW YORK • ATLANTA • CLEVELAND
CHICAGO • ST. LOUIS • PHILADELPHIA
SAN FRANCISCO • LOS ANGELES

MAGIC CHEF

SERIES 1400



Magic Chef
AMERICAN STOVE COMPANY

of increase in the quantity sold that would follow a specific difference in price of gas for each class of service. The method used was to analyze the sales experience of all available records of sales to large cities with each class of use considered separately, that is, cooking, water heating, space heating, commercial and industrial sales. This normal experience of sales per average consumer at specified rates was, for each classification separately, plotted in co-ordinate diagrams showing the value of sales in relation to rates.

These experience points on the diagram were then connected with a smooth curve running from maximum to minimum values, in which this smooth curve was taken as the statistical average experience of unit quantity sold at each rate. The shape of each curve was then expressed in a correspondingly definite formula that could be used in calculating normal unit volume of sales expectancy at a given rate.

It was found in this study that the product of these variable unit sale quantities by the rates to which they correspond could be plotted in turn as a curve representing revenue at different rates, and that these curves of revenue, in each instance, attained a maximum value somewhere in the vicinity of the lower price brackets and large unit volume of sales. This point of maximum revenue at low prices with large unit volume of sale, is the point in price level down to which the utility selling the product and the public using the product share a common benefit in the reduction of prices. This creates a maximum incentive to both the public and the utility to find and use this price level for its rate schedule. It is in this definite sense that we refer to "promotional rates" in the "Detroit Plan."

Where these ideal prices represent a substantial reduction below existing prices there is naturally great hesitation and fear on the part of the utility that it will be financially hurt by the immediate loss of revenue following the reduction of price and before that reduction has had an opportunity to develop its normal effect on the quantity sold. This temporary hardship might be called the "growing pains" of sales promotion. This is particularly characteristic of the change from manufactured to natural gas. It is our suggestion to meet these threatened "growing pains" with a "shock absorber" in the form of an optional rate in addition to the general rate available to everyone. The latter is a more moderate step in price reduction, while the ideal rate is in the form of an optional rate which is available to those who are prepared to use an increased quantity of service.

Customers' Dividend

It is the policy of this customer dividend that it shall accrue exclusively to the benefit of domestic consumers, not to commercial or industrial establishments or large wholesale users. The sale of gas to these large consumers is a matter of competitive price relative to other fuels, and their business must be secured through a rate that makes the service attractive to them. Not only will the industrial establishments have secured this economic benefit, but natural gas service will exert a stimulating effect on their operations by its economy and desirability, and will tend to give industrial stimulus to the entire community. On the other hand, for domestic consumers, as defined, gas service is essentially a monopoly in which their interest must be protected by establishing authoritively a limitation of prices. It is therefore in behalf of these consumers that rate regulation is essentially necessary, and it is desirable that all elements of the rate, including the dividend, shall be an encouragement to such consumers to use the gas service freely for their requirements for cooking and water heating. It is to accomplish this purpose that "domestic consumers" have been defined under the plan as follows:

"All consumers using gas for cooking or water heating in single family dwellings or single family apartments, separately metered. All dividends paid to these domestic consumers shall be distributed pro-rata in proportion to the amount paid for gas purchased up to a maximum of 60,000 cubic feet per year of natural gas."

The basic plan for putting this agreement into effect is to have the legal staff of the City and gas company prepare a consent decree by which, with the approval of the court, the pending rate litigation would be withdrawn from the court, and this decree approved as a basis for such withdrawal.

To this end the terms of the plan have been made retroactive to April 8, 1935, the date when the contested increase in manufactured gas rates was put into effect. Should it develop that the gas company exceeds the agreed base earning during the period from April 8 to the inauguration of natural gas service, this retroactive feature will serve as a practical limitation of earnings for that period, which will accomplish approximately anything that might have been secured as a result of the litigation.

It is the confident expectation that this plan will provide, among other things, a virtually automatic substitute for all future rate regulation in this utility, and that it will furnish an incentive for the perpetual and unlimited increase of economy, efficiency and maximum market development of the natural gas business in Detroit, inasmuch as no limitation is placed on the ultimate earnings of the company, other than that they be shared in the proportions formulated.

It is also expected that it will develop a popular interest in the success of the gas company's operation that will tend to create mutual cooperation, rather than controversy. It is further expected that the business will develop to the point where the annual dividend check will be a welcome visitor in each Detroit home.

In advance of the actual construction of the Detroit pipe line, there is not only provided by this arrangement a market for the full capacity of the line, but also a full agreement on both the city gate wholesale rate and the rate for domestic distribution, with all future litigation or controversy probably eliminated.

It is expected that much more than the 90 million cubic feet mentioned in the contract will be eventually sold in Detroit, providing an outlet for any excess gas that may be developed in the State of Michigan. The consummation of this agreement provides for the longest direct transportation of any considerable quantity of gas in the history of the industry (about 1200 miles) and will employ facilities of the various corporate links in the chain of production, transportation and distribution of natural gas, having an aggregate invested capital in excess of 130 million dollars.

Looking at the solution of this general problem in perspective, it is an impressive fulfillment of Mr. Gallagher's broad, farseeing vision of the duty and spirit of corporate leadership when he said in the address referred to previously, "I consider it to be the most important duty of public utility mangement in the next few years to sit down with representatives of government to create mutual understanding of the problems involved in best operating and maintaining public utility service."

The writer cannot close this discussion without giving testimony that such a result would have been impossible, had he not been met with a high degree of fairness, broadmindedness and courageous willingness to adventure on a novel course on the part of Mr. Woolfolk. Worthy of mention, too, is the unusual degree of confidence shown by those in financial control of his company in delegating to Mr. Woolfolk such full responsibility in deciding the course of action in the Detroit property.

"Merchandise Certificate" Plan for Coast Counties

IN its January electric merchandising and load-building event the Coast Counties Gas and Electric Co., Santa Cruz, Calif., is using an appliance purchase inducement scheme which to the best of *Western Gas'* belief is brand new. As it has possibilities of application for gas appliance sales, under certain conditions, some of the details are given below, as supplied by H. W. Edmund, sales manager for Coast Counties.

During the January billing period each domestic electric customer will receive with his electric bill a "Merchandise Certificate" equal to 50 per cent of the charge for electricity used in the billing period covered. This certificate may be given by the customer to any cooperating dealer to apply on the purchase of any electric appliance listed on the reverse side of the certificate. The dealer may cash the certificate at the utility's local office at its face value, less 10 per cent.

It is expected that dealers will readily see the possibilities in the plan and will accept the certificates as down payments on appliances. The comany believes that the $25,000 which is approximately the amount of the certificates can be trebled in sales volume if dealers and suppliers give the plan active support.

The first certificates probably will be in the hands of customers on January 6, and since the billing is over the entire month there will be a constant flow of certificates throughout the period of the offer. The date limiting use of the certificates is February 29, 1936.

A sample certificate, together with a proof of an announcement advertisement, was enclosed with a letter to dealers, sent out in December.

BEST IN '35 BETTER IN '36

GARLAND

GAS RANGES

We predict nineteen thirty-six will disclose the greatest volume of range buying in the Nation's history. And the most successful contributors to this coming, all-high record of profitable retail range selling will be the dealers who display these new Garlands.

American housewives are tired of "repairing"! 1936 will be a year of "replacing." We, therefore, present for 1936, the Gas Range built to meet a natural consumer replacement urge for quality, efficiency, modern beauty and convenience. This 1936 Garland combines all of those virtues. It is the finest Garland we have ever built.

Displayed . . . these ranges will prove they have "reason-why" selling power. Every feature is basic, perfected, superior. Intelligently designed, expertly constructed, sensibly priced . . . this Garland is destined to become synonymous with "my preference" among American housewives in 1936.

Garland's New Ceramic Radiant Broiler and New Automatic Oven Lighter Available for All Models At Slight Additional Cost.

DETROIT-MICHIGAN STOVE CO.
Detroit, Michigan

SELF-SELLING
BEAUTY
AND
QUALITY

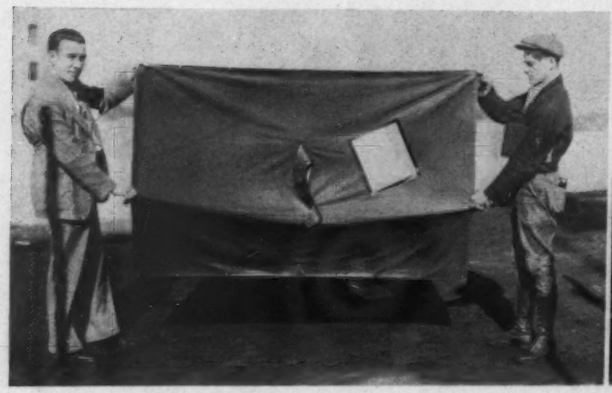
■

RANGES THAT
Assure
VOLUME
AND
PROFIT

■

CATALOGUE OF THE
ENTIRE 1936 LINE
NOW READY

Showing construction of new-style rubber poncho used by San Diego Consolidated Gas and Electric metermen.



Rubber Ponchos Protect Meter Books in San Diego

IN rainy weather meter readers for the San Diego (Calif.) Consolidated Gas and Electric Co. are now appearing in weatherproof rubber ponchos, in which celluloid windows have been inserted.

Some time ago the company changed its bookkeeping set-up and the meter books became a permanent part of a three-stub ledger system, so that it was imperative that the sheets be kept dry. So long as meter readings were copied from the meter books into permanent ledgers this problem was not so serious.

Putting the books back into usable condition after a rain involved so much inconvenience and interruption to routine that it was decided to experiment with the ponchos. The style selected and illustrated above is of standard black rubber, light weight, and size 45 by 72 inches. The window is sewed on at an angle to improve visibility of the books, and is 11 by 12 inches in size. The ponchos cost $3.75 each.

With their use both book and meter reader's arms are kept under cover. The shape of the poncho enables the meter man to use his arms freely for opening doors, etc.

Although metermen were skeptical before putting the ponchos to use, the first rain made them 100 per cent enthusiastic, and the books were returned to the office perfectly dry. Also, J. C. Bivens, superintendent of meter reading for the company, reports that the ponchos attracted much favorable notice from customers.

A special cupboard in the meter readers' department houses the ponchos, which are hung without folding until needed.

Merco Nordstrom Conducts Sales Conferences at Oakland Plant

THE Merco Nordstrom Valve Co. recently held a series of conferences for its sales representatives from various parts of the country at the company's Oakland, Calif., plant. Under the direction of Colonel W. F. Rockwell, president, these men first attended the A.P.I. convention in Los Angeles, then made an extensive trip through the California oil fields and concluded the tour with a week of study and conferences at the Oakland plant. At the meetings late developments in the manufacture of the company's products were demonstrated and sales plans for the new year were outlined.

Among those attending the sales sessions in addition to Colonel Rockwell were L. A. Dixon, of Pittsburgh, Pa., vice president, and Walter H. Davis, vice president at Oakland, who acted as host to the visiting sales staff.

Insull Reported Entering Radio Field

Samuel Insull, head of the former Insull utilities interests, is reported to be planning the organization of a radio chain to operate throughout the Central West. It is understood that the proposed chain contemplates a network composed of small stations of 50 and 100 watts.

Gas Service Co. Properties to be Known as Gas Service Co.

THE Gas Service Co., holding company headquartering in Kansas City, Mo., on December 1 took over its operating properties in Kansas, Missouri, Oklahoma and Nebraska. The principal distributing companies involved, and each of which from that date are to be known as the Gas Service Co., were formerly the Arkansas Valley Gas Co., Capital Gas & Electric Co., Girard Gas Co., Hutchinson Gas Co., Newton Gas Co., Pittsburg Gas Co., Western Distributing Co., and the Wichita Gas Co., in Kansas; the Carthage Gas Co., Jackson County Light, Heat & Power Co., Joplin Gas Co., Ozark Distributing Co., St. Joseph Gas Co., and the Webb City & Carterville Gas Co., in Missouri; the Bartlesville Gas & Electric Co., Okla., and the Union Public Service Co. of Kansas and Oklahoma; and the Nebraska Distributing Co. and Fremont Gas Co. in Nebraska.

T. T. Johnson Joins Republic Steel

T. T. Johnson, formerly general superintendent at the Bessemer, Ala., plant of the U. S. Pipe and Foundry Co., has been appointed sales metallurgist for Republic Steel Corp., pig iron division, according to announcement by Earl C. Smith, chief metallurgist. Mr. Johnson will be attached to the Birmingham, Ala., district of Republic Steel.

Making the Most of F.H.A.

(Continued from Page 11)

behind the plan got real results—increasing their business two and three-fold over previous showings for corresponding periods.

Through cooperation with the banks P. G. and E.'s F.H.A. plan made terms available on purchases as low as $35, opening up a wide stratum of buying power. Special effort was put on heating and refrigeration, which benefitted notably from F.H.A.

The present promotion, using the approaching termination of F.H.A. terms to build up special dealer sales work during January, February and March, will employ much the same methods as were found effective in taking the original story to the dealers. Each of the 12 division offices has already been contacted, and dealer representatives are busy reselling their dealers on making all possible use of F.H.A. while its exceptionally favorable financing provisions are still available.

From the utility's standpoint F.H.A. has been a great success because it has removed all credit risks and responsibility for collection of bad debts, translating all time payment sales into cash transactions.

To dealers the plan has offered simple and direct financing at the lowest interest charges ever available, without recourse upon the seller, and with 100 per cent advance of money—whereas most finance plans do not pay out in full until contract payments are completed, and usually charge back bad debts.

It is not difficult to understand why the P. G. and E.'s promotion of F.H.A. has been so productive. Success was inherent in the favorable terms of the plan, provided company sales forces and dealers could be sold the idea of using it. P. G. and E. left no stone unturned to do this sales job thoroughly.

New Paso Robles Office

The Paso Robles branch of the Santa Maria (Calif.) Gas Co. moved into a new building on December 19. The new office is equipped with air conditioning, provided by a Payne No. 120-A furnace with a blower and air washer. The duct work is so arranged that the unit can be used either as a circulating or fresh air supply system.

Utility Accounting

"An Introduction to Gas Utility Accounting" by C. P. Thompson, has been published recently. Mr. Thompson, of the Department of Business, Los Angeles Junior College, was formerly in the accounting department of Los Angeles Gas & Electric Corp. under E. N. Simmons, auditor and assistant secretary, to whom the book is dedicated. The book treats of accounting problems peculiar to gas utility corporations.

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From experience never before duplicated come . . .

NEW GAS RANGES *which*

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★ *the* **SERVICE MAN** *will cheer for!*

★ *the* **ENGINEER** *will welcome!*

★ *your* **COMPETITION** *will view with alarm!*

COMPLETE DETAILS *will reach you during the latter part of January*

NORMAL SHIPMENTS *March 1st*

Thank you, Mr. Gas Industry! Only with your help has it been possible to gain the experience necessary to develop models that will again set new and higher standards for gas range performance!!!

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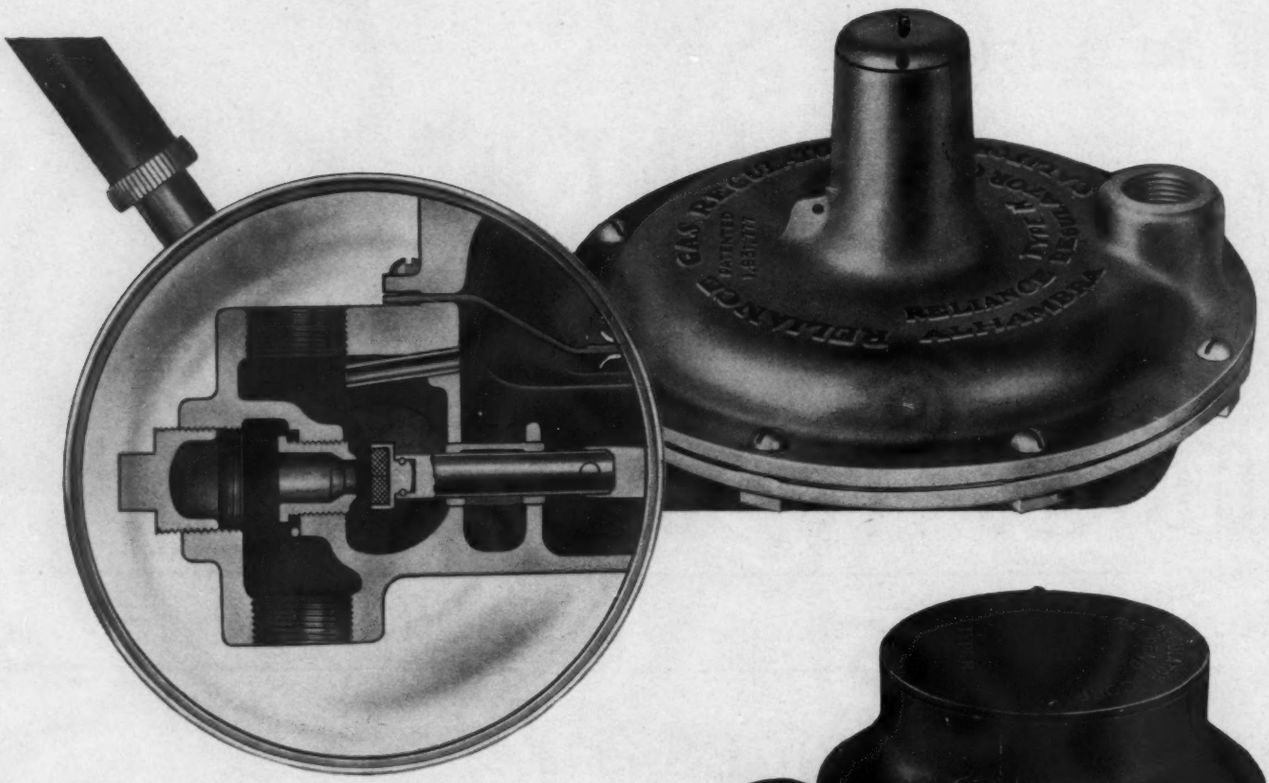

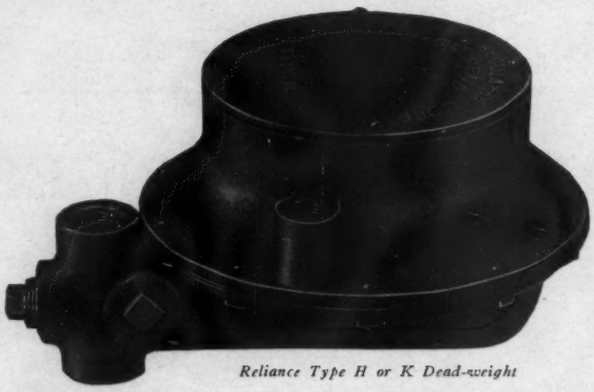

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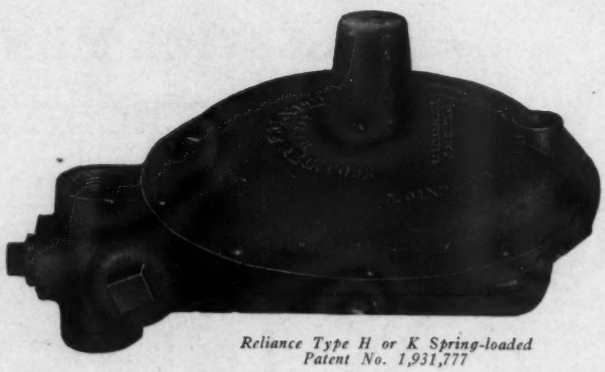

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MEASUREMENT and CONTROL

Heat Accounting with Power Plant Instruments

By F. G. PHILO
Superintendent of Fuel-Electric Stations
Southern California Edison Co. Ltd.

USE of natural gas in the Southern California Edison Co.'s Long Beach steam plant was discussed by F. G. Philo before the Southern California Meter Association at the Exhibitors' Night program in November, 1933, the paper appearing in *Western Gas* for January, 1934. Mr. Philo returned to the S.C.M.A. as a guest speaker on November 21, 1935, contributing the discussion which appears in these pages.

Daily requirements for natural gas at the Long Beach steam plant may run as high as 130 million cubic feet, making it outstanding among large industrial installations.

Mr. Philo is superintendent of fuel-electric stations, Southern California Edison Co. Ltd. Mem. A.S.M.E. He was educated at Ohio State University and in 1911 participated in the Delray tests of large boilers of the Detroit Edison Co. From 1912 to 1914 he was boiler room engineer for the Corn Products Refining Co., Edgewater, N. J., and later was efficiency engineer for the Harwood and Hauto power stations of the Lehigh Navigation Electric Co. During 1918-1919 he placed in operation the Burling Slip Station "A" of the New York Steam Corp., and was appointed chief operating engineer of its downtown New York district. From 1919 to 1924, Mr. Philo was connected with Stone & Webster, Inc., as engineer in the power-station betterment division. Most of his time was spent in power-station betterment and initial operation of new power stations. In 1924, after placing the Long Beach steam plant of the Southern California Edison Co. Ltd. in operation for Stone & Webster, Inc., he was appointed to his present position.—*Editor.*

WELL managed business and financial establishments maintain close check and supervision over the flow of money through their institutions. Exact and detailed accounting is provided for receipts, disbursements, debits, credits, profits and losses. Reasonable outlay for an adequate staff of bookkeepers, accountants, and auditors, with necessary equipment for their work is an accepted necessity to the end that all money be properly accounted for, losses detected, and a profit assured.

In the industrial plant it is equally important that materials purchased with, and sold for money be similarly accounted for with almost equal exactness to the same end that losses be detected, and the greatest profit assured. Some items dealt with are similar to money with tangible values, others are intangible, not themselves apparent to the senses in forms by which their bulk and magnitude can be visualized. Heat, light, power, electricity, and operating efficiency of equipment can not be evaluated by sight and feeling alone, and it becomes necessary to provide aids to our senses to make their presence and magnitude apparent. Such mechanical aids in the power plant are loosely classified as instruments. Such instruments take many forms, serve varied purposes, and are as necessary a part of most well managed, efficient industrial enterprises as the adding machine, comptometer, and filing system is to the office.

In the central power station fuel usually represents 70 to 90 per cent of the operation and maintenance costs where the average annual loading of the station is greater than 50 per cent of its maximum capacity. Any loss in any part of the power plant is reflected in greater use of fuel, for fuel is the raw material, or "crude heat", from which the refined heat product, the "Kilowatt-hour", is obtained.

Changing conditions in the business and financial world beyond the control of management may turn profits to losses; but it is almost inexcusable to accept unknown or unnecessary heat losses within a plant where conditions can be so thoroughly controlled.

In the fuel electric generating station heat units, not money, form the medium of exchange. Heat in the form of fuel is purchased with money, and heat in the form of kilowatt hours of electricity is sold for money. Between purchase and sale of the raw and refined product all accounting is most readily carried in heat units; in the United States usually the British thermal unit, or B.t.u., instead of dollars. Input to the process is measured heat units in the fuel. Output of finished product is accounted for by the heat equivalent of the electricity delivered from the central station. The ratio of output heat units to input heat units represents the efficiency of the plant.

The British Thermal Unit (B.t.u.), or the Unit of Heat in the British System is 1/180th of the heat required to raise the temperature of 1 pound of water from 32° F. to 212° F. Common Equivalents:

1 B.t.u. = 778 ft. lbs. of work.
1 Kilowatt hour (kw-hr.) = 3,413 B.t.u.
1 Horsepower hour (hp-hr.) = 2,545 B.t.u.

The heat content of fuels varies with composition, representative values being about as follows:

One lb. fuel oil contains about 18,600 B.t.u.

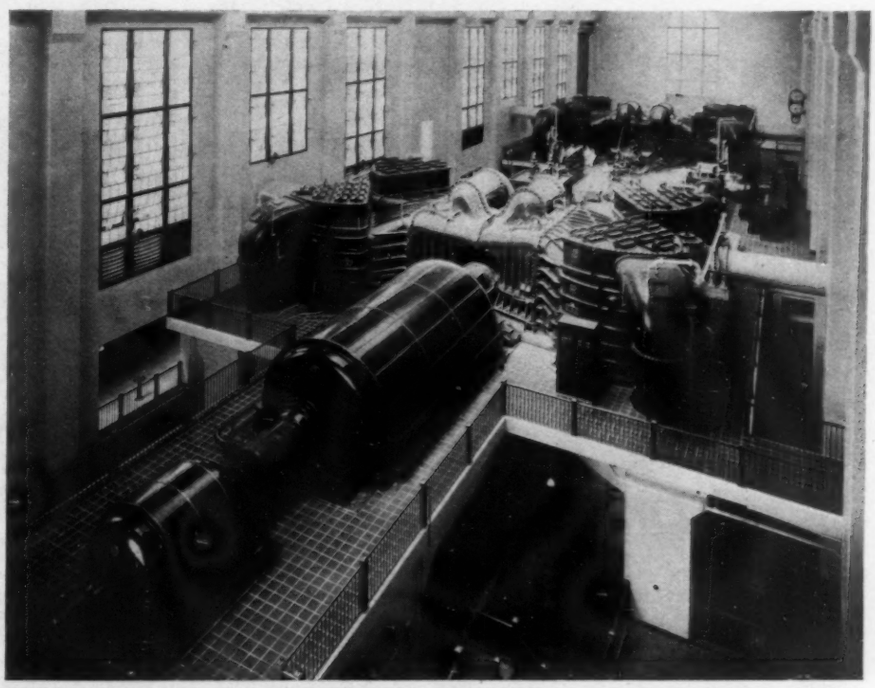


FIG. 1. General view of turbine room, Long Beach Steam Plant No. 3, Southern California Edison Co. Ltd.

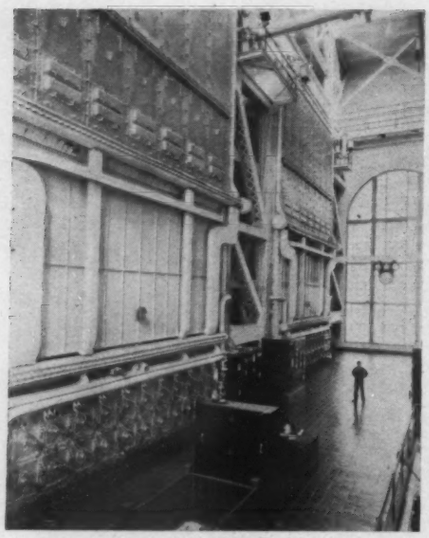


FIG. 2. View of boiler room firing aisle, Long Beach Steam Plant No. 3, Southern California Edison Co. Ltd.

One bbl. of fuel oil (42 gal. or 336 lbs.) contains 6,250,000 B.t.u.

One cu.ft. of natural gas may contain about 1,140 B.t.u.

One lb. good West Virginia coal contains about 15,000 B.t.u.

One ton of coal = 4.8 bbls. oil or 26,300 cu.ft. of gas.

One bbl. of fuel oil = 0.208 tons of coal or 5,480 cu.ft. of gas.

In this industry, with modern equipment, it is possible to convert slightly over one-fourth of the raw material heat units into finished product heat units. Net profits are small and may be greatly affected by savings or losses which represent only a small fraction of the gross input. It is most important that proper checks and accounting be had of the flow of heat through the process, that necessary losses be known in location and magnitude, that the proper relation between input and output be maintained continuously in each step of the process to the end that unnecessary losses be quickly corrected and a profit assured.

In this connection one can hardly return from a visit to one of the large automobile manufacturing or assembling plants without the thought in mind—"Can't more of this highly developed system and efficiency be applied to my plant and to my process?" Accounting for losses of heat is as important to the boiler plant and power station as accounting for loss of labor, material and product in the other forms of industrial enterprise.

A good conception of the flow of this river of heat through the modern fuel-electric station may be secured through a study of the heat balance diagram shown in Fig. 3. Note the whirlpools and eddies, where heat salvaged from one part of the process is returned again to the main current. Observe the trickles of heat escaping from various points to unavoidable losses, and the gathering of the finished product—power, from the several sources. Compare the volumes of input, output, and losses. Visualize the processes, chemical, mechanical, and electrical, involved. Consider the temperatures encountered, which may be over 3,000° F. in the boiler furnace. Pressures are as high as 3,200 pounds per square inch in some experimental boilers, and near a perfect vacuum in modern condensers. Materials handled, measured and accounted for include fuel, air, gases, water, steam and oil. Compared to the accounting for dollars, heat accounting is a difficult problem although by no means impossible with present day engineering knowledge and instruments.

Generally speaking, for any process—

$$\text{the efficiency, in per cent} = \frac{\text{output}}{\text{input}} \times 100 \quad (1)$$

For the steam-electric generating station this becomes

$$\text{Entire Station efficiency in per cent} = \frac{(\text{kilowatt hours sent out}) \times 3{,}413}{(\text{Amount of fuel}) \times (\text{its unit heating value})} \times 100 \quad (2)$$

where 3,413 represents the heat equivalent of 1 kilowatt hour of electrical energy, and the amount of fuel may be expressed as pounds of coal, barrels of oil, or cubic feet of gas according to the fuel used, as long as the heating value is given for the same unit.

To aid analysis, division of the power station is usually made into two departments, the boiler room and the engine or turbine room.

Boiler room efficiency in per cent =

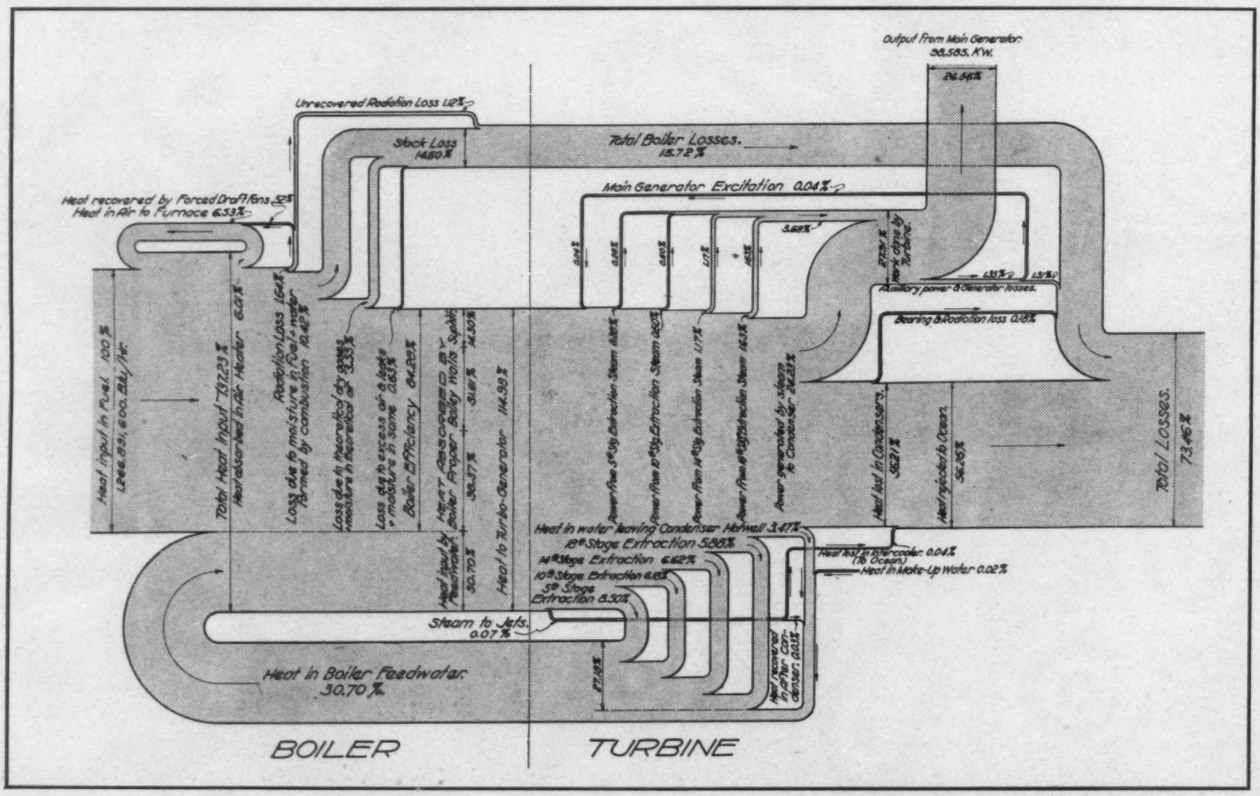

Output from Main Generator 39,585. K.W.
26.54%
Unrecovered Radiation Loss 1.2%
Stack Loss 14.80%
Total Boiler Losses. 15.72%
Main Generator Excitation 0.04%
Heat recovered by Forced Draft Fans 5.2%
Heat in Air to Furnace 6.53%
Auxiliary power & Generator losses.
Bearing & Radiation loss 0.18%
Heat Input in Fuel 100.%
Total Heat Input 73123.% B.t.u./hr.
Heat unaccounted for 6.07%
Radiation Loss 1.6%
Loss due to moisture in Fuel + water formed by combustion 10.42%
Loss due to Humidity in Air 2.33%
Loss due to excess air & moisture in same 2.6%
Boiler Efficiency 84.29%
Heat Absorbed by Boiler Proper & Superheater 38.77%
Heat Absorbed by Boiler Feed Water Heaters 14.93%
Heat to Turbo-Generator 30.70%
Heat Input by Feedwater
Power from 5th Stg. Extraction Steam 4.82%
Power from 10th Stg. Extraction Steam 6.62%
Power from 14th Stg. Extraction Steam 1.7%
Power from 18th Stg. Extraction Steam 12.1%
Power generated by steam to Condenser 24.23%
Heat lost in Condensers 56.21%
Heat rejected to Ocean 56.16%
Total Losses. 73.46%
Heat in water leaving Condenser Hotwell 3.47%
13th Stage Extraction 5.86%
14th Stage Extraction 6.62%
10th Stage Extraction 4.8%
5th Stage Extraction 0.92%
Heat lost to Intercooler (To Ocean) 0.04%
Heat in Make-Up Water 0.02%
Steam to Jets 0.07%
Heat in Boiler Feedwater 30.70%
Heat rejected to Air by Condenser 0.03%
BOILER
TURBINE

FIG. 3. Heat balance diagram based on test data for three 3,416 bhp. boilers and one 104,000 kw. turbine-generator unit, Long Beach Steam Plant No. 3, Southern California Edison Co. Ltd. Widths of channels are proportional to heat flows.

$$\frac{\text{(Lbs. of steam sent out)} \times \text{(Heat per lb. steam} - \text{the heat per lb. feed water)}}{\text{Heat in the fuel}} \times 100$$

or using accepted symbols,

$$\text{Boiler efficiency} = \frac{W(H-q)}{\text{Heat input}} \times 100 \qquad (3)$$

and engine room efficiency, or steam cycle efficiency in per cent =

$$\frac{\text{Heat equivalent of the energy generated}}{\text{(Lbs. of steam used)} \times \text{(Heat per lb. steam} - \text{heat per lb. feed water)}} \times 100$$

or Steam cycle efficiency in per cent =

$$\frac{\text{Kwh} \times 3{,}413}{W\,(H-q)} \times 100 \qquad (4)$$

Where W = pounds of steam used
H = heat content per lb. steam, B.t.u. per pound
q = heat content per lb. feed water, B.t.u. per pound

In the above equations the heat contents of steam, water, and fuel cannot be measured directly by instruments. Exhaustive research has been made of the physical and thermal properties of water and steam and if the steam pressure and steam and water temperatures are known it is possible to obtain the unit heat contents from steam tables and diagrams. The heat content of fuels may be determined directly from the fuel in some form of calorimeter, or the fuel may be analyzed and its heating value determined from the known heating values of its constituents.

As the modern bank or business grows it is divided into departments dealing with related activities, the number and size of departments increasing with the volume and complexity of the undertaking.

Similarly as the modern station grows it also tends to increase in complexity. Individual boilers and generators increase in size, more heat saving equipment is added, and the volume of raw material and output becomes larger and larger.

The plant illustrated in Fig. 1 and Fig. 2 houses two turbine generator units of 125,000 h. p. each, and six 3,416 h. p. boilers. The six boilers are capable of producing in excess of 2,400,000 pounds of steam per hour, which is delivered to the turbines at a pressure of 410 pounds per square inch and a temperature of 750°F. At full capacity the station has a daily input of raw material in the form of natural gas fuel of about 55 million cubic feet or some 60 million B.t.u's. It produces a daily output of finished product of 4,800,000 kilowatt hours or approximately 16 billion heat units, converting slightly less than 27 per cent of the heat value of the raw material into finished product. The gas fuel used would supply the ordinary needs of a city of 400,000 homes or approximately a million and a half people.

The efficient utilization of this volume of heat requires the use of much auxiliary equipment in addition to the boilers, turbines, and generators. The general arrangement is as shown in the schematic diagram illustrated in Fig. 4, which not only shows the relation of the major pieces of equipment, but includes the more important metering equipment as well.

While the final answers desired in power plant heat accounting are those given in equations (2), (3), and (4), the basic material for their calculation must be secured from a number of sources. The data must be in sufficient detail to analyze the major sections of the station, and sufficient instruments should be provided that the performance of each piece of equipment can be analyzed separately when required.

The actual data compiled are shown in Fig. 5, which gives in tabular form the items computed, their source, and method of calculation.

Such calculations are made daily for each steam station belonging to the system, the data being assembled on 11 x 13 inch cards, each card holding half a month's record (Fig. 6). Monthly and yearly values are averaged and transferred to corresponding cards (Fig. 6) for easy comparison, and similar combined reports are made for the combination of plants composing the system. The card system of compilation provides an extremely compact and accessible method of accumulating this data, many years records being conveniently contained in a single 11 x 13 inch filing cabinet.

In addition to the rather limited instrument equipment required for an economy report, it is desirable to provide instruments for checking the performance of each important piece of equipment. Instruments of various sorts are also necessary, solely for the guidance of the operator in charge. Perhaps this is nowhere more noticeable than in the boiler room of today, where the attendants no longer waste much time looking at the fires or observing with satisfaction the majestic plumes of black smoke which formerly billowed from the stacks. The fireman no longer shovels fuel into a dirty firebox while keeping a watchful eye on the water level in a clouded glass gauge. In fact, the boiler room is no longer in its old

ITEM NO.	ITEMS GENERATION	DATA CARD	DAILY OPERATING CARD	EVAPORATION CARD	DAILY ASSISTANT CARD	DAILY STATION ASSISTANT CARD	SOURCE OF INFORMATION METERS, REPORTS, ETC	CALCULATIONS
	CARD KEY NO.	1,2,3	1,2,3	1,2,3	1,2,3			
1	Machines operating		1,2,3		1,2,3		Data from Daily Operating Report - prepared by switchboard operators	
2	Gross kwh generated	1,2,3	1,2,3				Daily readings of watt hour meters on each main generator - one set for 24 hr. day, totals	
	Gross kva generated				2,2,3	D	Monthly and yearly totals are the sum of the gross kva from Card B (1D) and D (1F)	
3	Total output kwh	1,2,3	1,2,3				Data from daily recording recorder, sum of Aux. kwh. meter & gross kwh. meter	
	Auxiliary kwh				2,2,3	D	Monthly and yearly totals are sum of aux. kwh. from card B (1G) Card D (1J)	
4	Net output kwh	1,2,3,	1,2,3				Data from daily recording Recorder or integrator	Item (3)-(3)
	Net output kva				1,2,3	D	Monthly and yearly totals are sum of kwh outputs. From Card B (1G) Card D (1F)	Item (4)-(3)
5	Ratio kva of gross	1,2,3	1,2,3		1,2,3	D	Calculated.	Item (2)-(3) / Item (4)-(3) x 100
6	Engine load factor	1,2,3	1,2,3		1,2,3	D	Calculated.	Ratio of (Capacity of each machine & its operating time)
7	Annual & monthly load factor		1,2,3		1,2,3	D	Calculated.	Item (4)-(3) / Item (2)-(3) x Capacity x Item 365(D)
8	Use plant & station load	1,2,3	1,2,3		1,2,3	D	Calculated.	Item (4)-(3) - Item (3)-(3) = Station Load.
	EFFICIENCY							
9	Fuel kwh per bbl of oil	1,2,3	1,2,3		1,2,3	D	Calculated.	Item (4)-(3) x Total bbl of fuel per item (4)-(3).
10	Btu per bbl fuel	1,2,3	1,2,3		1,2,3	D	Calculated.	Btu per bbl oil = 6,250,000 plus Item (3) from bbl oil = 6,250,000 Btu
11	Boiler efficiency	1,2,3	1,2,3		1,2,3	D	Calculated.	Item (3)-(3) Pounds of water - steam, or feed = Item (3)-(3) x Item (3)-(3) Btu per lb. of fuel = Item (3)-(3) Btu.
					2,2,3	D	Calculated.	Item (3)-(3) Pounds of water - steam, or feed = Item (3)-(3) x Item (3)-(3) Btu per lb. of fuel = Item (3)-(3) Btu.
12	Steam cycle Btu per gross kwh	2,3	2,3		2,3	D	Calculated.	1st lb water per pound fuel = (H-q) or Item (3)-(3) / (H-q) = Item (3)-(3) x Item (3)-(3) = Item (3)-(3) of evaporation = Item (3)-(3) Btu
13	Steam cycle efficiency	2,3	2,3		2,3	D	Calculated.	Item (3)-(3) x Item (3)-(3) = Item (3)-(3) Btu per kwh. Item (3)-(3) Btu per kwh / Item (3)-(3) Btu per lb. of fuel = Item (3)-(3) x 100 = Item (3)-(3) Steam cycle efficiency
	OPERATING CONDITIONS							
14	Steam pressure at throttle	1,2,3	1,2,3				Daily average of pressure charts from each unit.	This is a night entrance from charts, but may also be from recording gauges.
					2,2,3	D	Arithmetical average of Daily Values. Card A (1a) Card B (1F)	
15	Steam temperature at throttle	1,2,3	1,2,3				Daily average of temperature charts from each unit.	Sum of daily arithmetical averages for each unit & its net output = kilog. calorie.
					2,2,3	D	Calculated.	Total & equivalent water. Item (4)-(3) = pounds of water per lb of fuel = Item (3)-(3) Btu per lb. of fuel = Item (3)-(3) Btu per lb. of evaporation (H)
								Percentage of superheat = Item (3)-(3) - Item (3)-(3) / Item (3)-(3) x 100 = Item (3)-(3) Percentage of superheat.
								Q may be obtained from steam tables or with satisfactory accuracy for moderate temperatures by the formula.
								Then q = 1.0 + .00005 (t - 32) + .0000009 (t - 32)² (in which t = temperature in degrees F. and q = heat in B.t.u. per lb. above 32° F.)
								Item (3)-(3) = Item (3)-(3) + Item (3)-(3) + Item (3)-(3) = Item (3)-(3) Heat in B.t.u. per lb. of water.
								Item (3)-(3) = Item (3)-(3) - Item (3)-(3) = Item (3)-(3) Heat in B.t.u. per lb. of steam.
								Item (3)-(3) = Item (3)-(3) / Item (3)-(3) = Item (3)-(3) Pounds of steam per pound of fuel.
16	Feedwater temp. to economizer	2,2,3	2,2,3				Daily average of feedwater temperature charts for each unit.	This is the sum of the daily arithmetical averages for each unit & its net out of kilog. calorie.
				2,2,3	D		Calculated.	Table gives actual temp. take's extra temp. correction. Item (3)-(3) = Item (3)-(3) + Item (3)-(3) = Item (3)-(3) Actual temperature of feed water.
								Actual temp. this actual factor to be used in temperature correction curve if
								water line the method employs feedwater temperatures.
17	Injection water temperature	2,2,3	2,2,3				Daily average of injection water temperature charts.	
				2,2,3	D		Arithmetical average of daily values. Card A (1a) Card B (1F)	
18	Vacuum referred to 30 in Hg	2,2,3	2,2,3				Daily average of absolute pressure for each unit from engineer's log.	30 in Hg - Average absolute pressure.
				2,2,3	D		Arithmetical average of daily values. Card A (1a) Card B (1F)	
	WATER							
19	lb feedwater by Venturi meter	2,2,3					Total pounds of water through Venturi meters from charts or integrator.	
20	Actual water	2,2					Calculated.	Item (19) x Correct-ure correction factor. Actual water, as evaporated or water at a certain temperature. Plant is 0 at sea level, limit is 212 at 30"Hg. Use the feedwater temperature in place of boiler temperature where a separator is a part
21	Metering	2,2,3					Calculations for boiler blowdown, boiler fill, etc.	
22	Net water or boiler feed	2,2,3	2,2,3		2,2,3	D	Calculated.	Item (20)-(3) for plants 2 and 3. Item (19)-(3) for Unit No 3
23	Ratio of evaporation	2,2,3					Calculated.	Factor of intermittent (2-3a-b)(c-a)water to steam = Unit to recommend(2-3)(Unit test of evaporation
								Item (3) from (3) item (3) from tables with items (3) and (3)
								Item (3) from (3) the steam tables with item (3)
					2,3,3		Calculated.	Total evaporated water Item (20) x Factor = Actual water Item (20) x Factor = Actual water Item (20) x Factor = Actual

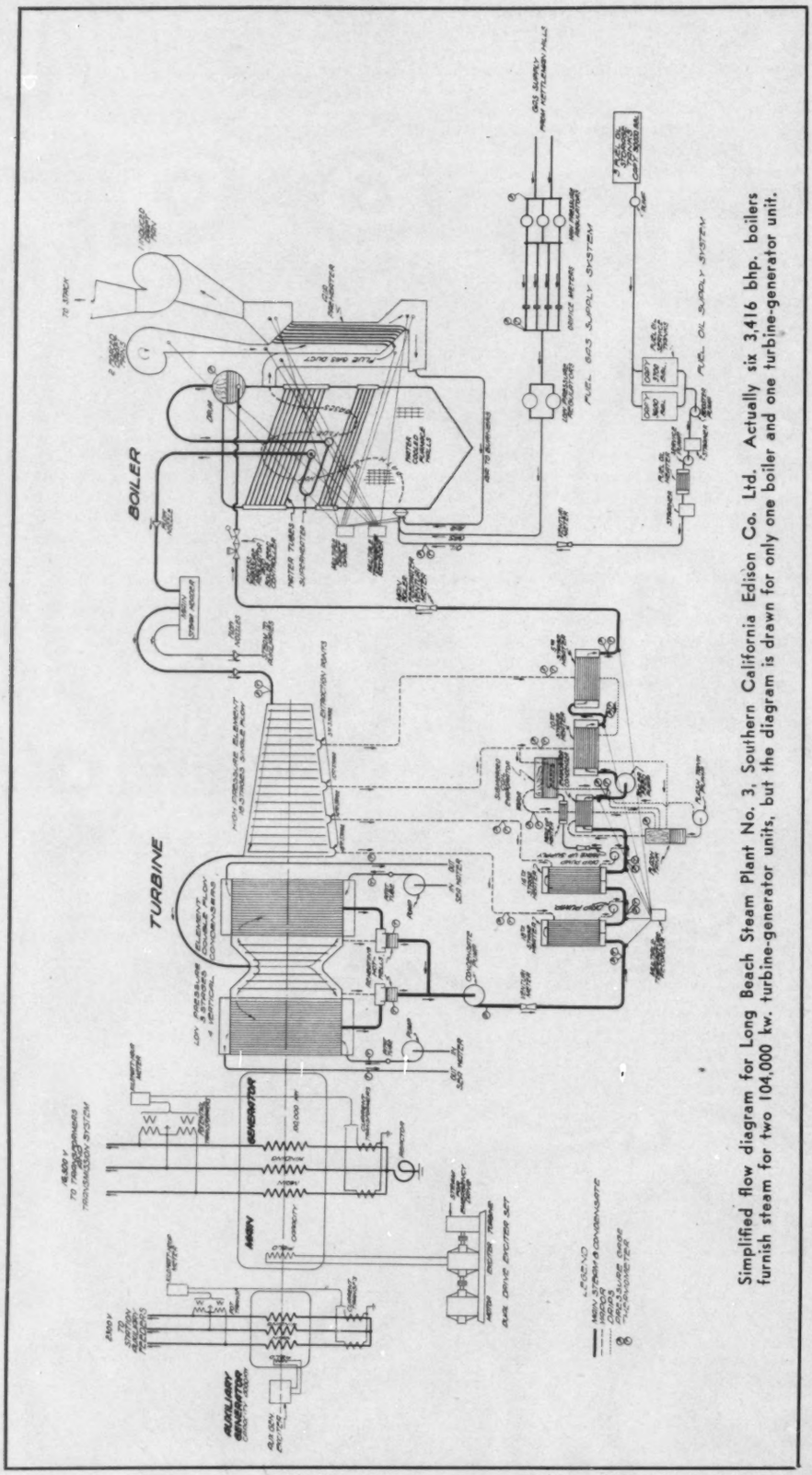

BOILER
TURBINE
GENERATOR
MAIN
AUXILIARY GENERATOR
Simplified flow diagram for Long Beach Steam Plant No. 3, Southern California Edison Co. Ltd. Actually six 3,416 bhp. boilers furnish steam for two 104,000 kw. turbine-generator units, but the diagram is drawn for only one boiler and one turbine-generator unit.

FIG. 4.

location somewhere in a hot dusty basement; a place of soot, grime and hissing steam, where half-naked men labored like black devils in the pit before glowing furnace doors. Instead, the fire room is now as light, airy and clean as your own home—a place of gauges, dials and push buttons, and an occasional flat top office desk. It is controlled by a few well dressed, leisurely occupied men who are paid for the brains in their heads rather than the muscles in their backs. Instruments show and maintain the proper relation between air and fuel. Water is fed automatically, its level being recorded on a gauge before the fireman's eyes. Steam, water and fuel flows are metered and recorded for his guidance. A multiplicity of draft gauges show air pressures through the setting and the proper balance in the furnace. Even the escaping flue gases are chemically analyzed by an instrument. The beautiful plume of smoke is no longer in evidence while the balance sheet shows extra dollars saved from the fuel bill.

The testing of gas- or oil-fired boilers by the "heat-balance" method is one of the most useful applications of heat accounting with power plant instruments, although the job is done in a negative way. The data supplied by indicating and recording instruments can be used quite accurately to account for the various losses in the combustion and heat transfer processes. Thus when firing gas of a heat value of 1000 B.t.u. per cu. ft. we can calculate from instrument records the total losses in B.t.u. per cu. ft. of fuel fired (even though the gas may not be metered). If the sum total of such losses are, say, 200 B.t.u. per cu. ft. of gas fired the inefficiency of the boiler and combustion process is $\frac{200 \text{ B.t.u.}}{1000 \text{ B.t.u.}} =$ 20 per cent—or an 80 per cent efficiency.

Such a method of heat accounting has long been used to test large transformers. By measuring and calculating the various heat losses of the transformer the efficiency of the transformer may be very closely determined.

The ultimate aim of most production processes is to obtain the maximum amount of finished product from a given amount of raw material, other costs assumed constant. It is also true that the efficiency of any machine or "series process" is equal to the products of the efficiencies of the various parts or departments. However, paradoxical as it may seem, close analyses of heat process studies occasionally prove the desirability of deliberately lowering the efficiency of one department if in doing so the efficiency of one of the other departments is more than correspondingly raised.

In industry, as well as in bridge, one must often "discard aces to make game or rubber." An example of this maneuvering for greatest net heat profit exists often in the power station between the boiler room and turbine room. The turbine operates most efficiently, other factors being equal, with the highest temperature of the superheated steam. Maximum steam temperatures from the boiler superheaters are obtained at very high loading of the boilers at a point where boiler efficiency is not the best. Compromise in such cases must be made so that the combination of lowered boiler room efficiency and raised turbine room efficiency will be at the maximum. Instruments and meters and the accounting of their records must, however, to be of greatest value be carefully supervised and results analyzed by those most capable of interpretation.

Heat accounting is still in its infancy, but the baby bids fair to have a rapid and healthy growth with promise of becoming an important partner in industrial efficiency.

TECHNICAL REFERENCES

Technical magazine articles referring to performance of the station and tests of equipment may be found in: "Electrical World" July 19, 1930; May 17, 1930; May 18, 1929, and October 6, 1928. "Power" January 24, 1928. Paper by F. G. Philo presented at A.S.M.E. meeting at Detroit in June, 1930, entitled "Comparative Performance of a Large Boiler Using Oil and Natural Gas Fuels." Article "Why Steam Ascendancy in California" in "Electrical West", August 1, 1930, gives operating and maintenance costs for Long Beach Steam Station. N.E.L.A. publication No. 078 on Turbines gives test of Unit 10 turbine-generator. N.E.L.A. publication No. 064 on Burning Liquid and Gaseous Fuels gives data on fuels obtained at this Station. Descriptive articles also appeared in "Stone & Webster Journal" December, 1930, and "Yale Scientific Magazine", November, 1931.

A recently published book, "Power Plant Engineering and Design", by Prof. F. T. Morse, discusses the cycle and heat balance used in Plant No. 3. Engineering instruments and their use are quite thoroughly described in "Experimental Mechanical Engineering" by Diederichs and Andrac—Vol. 1, John Wiley and Sons, while for a description of steam power plant equipment and operation, the reader is referred to "Steam Power Plant Engineering", Gebhardt, by the same publisher.

Entertainment Program Sponsored by S. C. M. A.

AN entertainment program sponsored by the Southern California Meter Association at its December meeting, drew an attendance of 425 members and their wives, and friends of the organization, with an equal number turned away for lack of room. The meeting was held on the evening of December 18 in the auditorium of the Los Angeles Gas and Electric Corp. in Los Angeles, and was devoted to music and the showing of a motion picture film. Both features were staged through the courtesy of Captain G. Allan Hancock, scientist and explorer.

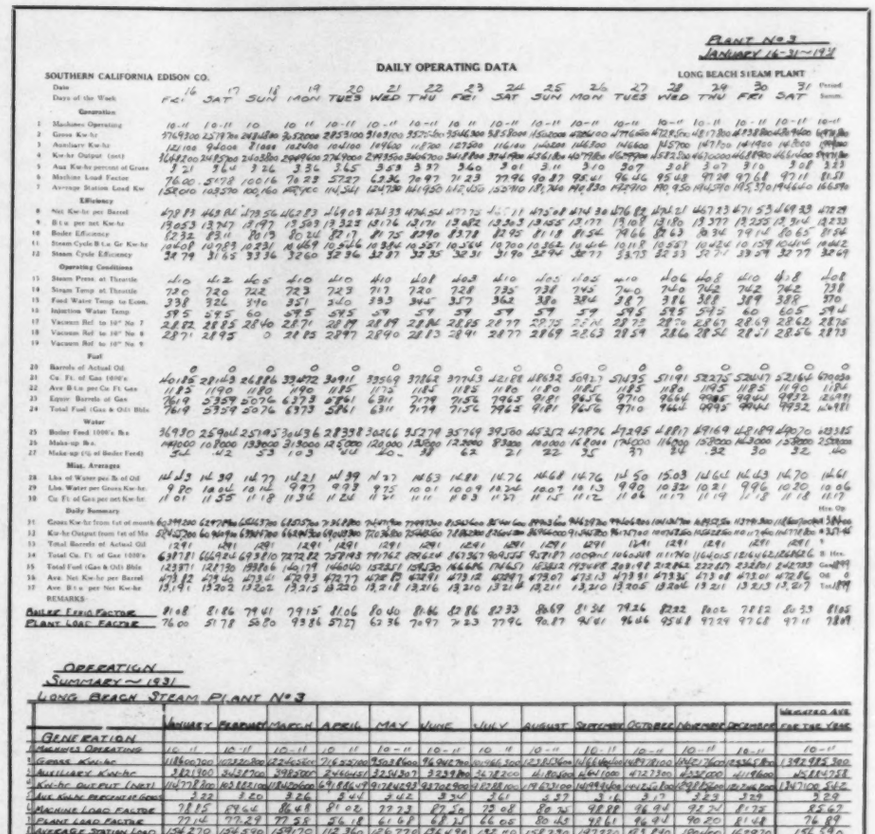
Music was provided by the seven-piece Hancock ensemble, made up primarily of scientists of the crew of Captain Hancock's Velero III, with Mr. Hancock playing the cello. The Velero III is an ocean-going vessel completely equipped with apparatus for scientific exploration. The subject matter of the film was the most recent cruise of Velero III through the Galapagos Islands and along the Equatorial shores of South America, showing many unusual and highly interesting shots of marine and land life in that corner of the world.

The program was sponsored by the S.C.M.A. with the cooperation of the Los Angeles Gas and Electric Corp.'s Employees Association. D. M. Hill of the Foxboro Co., program chairman, with the assistance of B. G. Williams, of Southern California Gas Co., was responsible for arranging the program.

Warren King, educational director of the L. A. G. and E. Employees Association, opened the meeting, introducing F. E. Bradley, president of the S.C.M.A., who extended a welcome to those present on behalf of the sponsoring organization. Following this Mr. King introduced Addison B. Day, president of Los Angeles Gas and Electric Corp., who introduced Mr. Hancock.

The first part of the evening was devoted to the musical program, and the latter part to showing the film.

The next meeting of the S.C.M.A. will be held on January 23. Charles E. Soyster, of the Richfield Oil Co, will present a paper on the application of the slide-rule in computing pressures from square root charts. Mimeograhed sheets will be distributed detailing the procedure. The balance of the meeting will be devoted to a discussion of questions that have arisen regarding the use of the new orifice meter coefficients since their publication in November.



PLANT NO 3
JANUARY 16-31-1932

DAILY OPERATING DATA

SOUTHERN CALIFORNIA EDISON CO. LONG BEACH STEAM PLANT

OPERATION SUMMARY — 1931
LONG BEACH STEAM PLANT NO 3

FIG. 6. Representative data cards showing method of recording and filing steam station economy data.

Strathroy, Ontario, Votes for Natural Gas

On December 2 the town of Strathroy, Ontario, voted a franchise to the Union Gas Co. of Canada Ltd., Chatham, Ontario, for serving natural gas. The company's recently completed 10-inch transmission line from the Dawn Field to London will be tapped at a point where it passes about 5 miles south of Strathroy. Construction of a transmission spur and distribution system will begin within 18 months from the date of the election.

Strathroy has a population of approximately 3,000 with some 600 estimated prospective consumers.

WHERE DEPENDABILITY IS NOT TO BE OVERLOOKED

Nothing conspicuous; nothing to catch your eye and make you stop; but there on the job serving you day and night—sure, reliable, accurate—are the dutiful Chaplin-Fulton Regulators. They show best where dependability is not to be overlooked.

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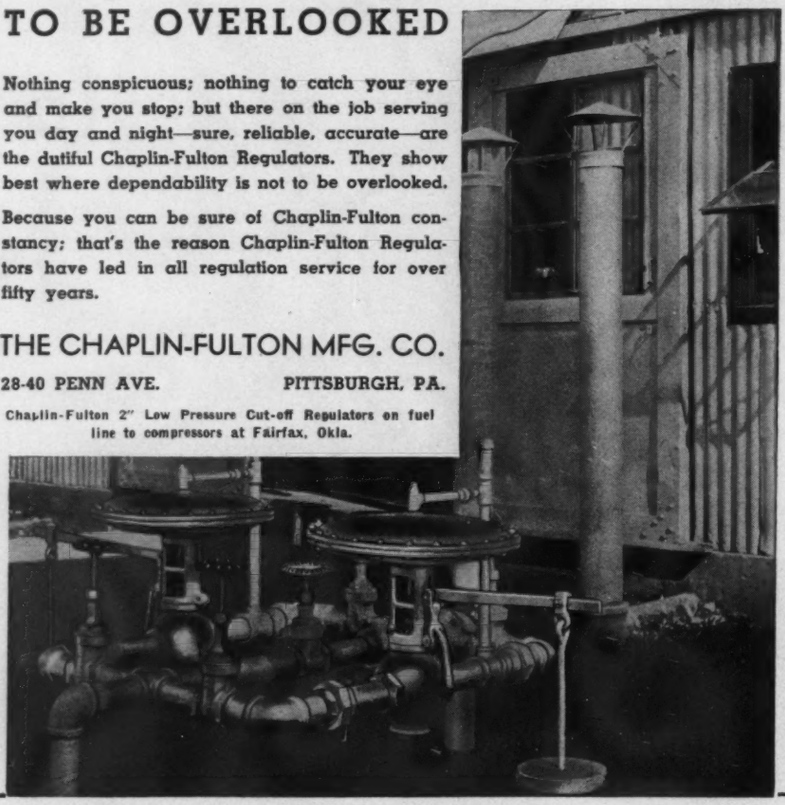


Chaplin-Fulton 2" Low Pressure Cut-off Regulators on fuel line to compressors at Fairfax, Okla.

E. M. CLORAN

H. J. EVANS

Pittsburgh Equitable Meter Co. Augments Research Staff

E. M. CLORAN, formerly plant engineer for Atmospheric Nitrogen Corp. and more recently sales engineer with Consolidated Ashcroft Hancock Corp., and H. J. Evans, of the geological department of Carter Oil Co. and Humble Oil Co. have joined the research staff of the Pittsburgh Equitable Meter Co. They will work at the physical laboratories of the company at Pittsburgh, Pa., under the direction of Allen D. MacLean, chief engineer, and under the supervision of L. M. Van der Pyl, research head.

Crane Co. Establishes Division of Research and Development

Crane Co., Chicago, has established a division of research and development which will centralize these activities at the company's Chicago plant. The program of the new division includes field research, development of industrial, plumbing and heating products, metallurgical research, and standardization and inventions studies.

M. W. Link, chairman of the Crane Co. committee on products, has been appointed director of the new division. Mr. Link will be assisted by a staff comprised of B. A. Parks, A. M. Houser, C. A. Olson, R. H. Zinkil, J. P. Magos and J. O. Lange.

J. L. Hecht Honored by Company

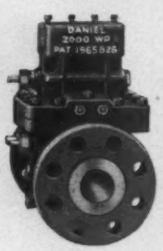
Julius L. Hecht, vice president in charge of operations of Public Service Co. of Northern Illinois, was awarded a 30-year service pin at a banquet given by the southern division of the company on December 5 at which he was the guest of honor. Mr. Hecht became vice-president of the company in 1923, formerly having held the office of assistant to the vice president with the duties of general superintendent.

A. B. Burns Passes Away

A. B. Burns, retired Pacific Coast manager of the Dearborn Chemical Co., passed away December 14. He had been Pacific Coast manager, with headquarters in Los Angeles, for 25 years prior to his retirement two years ago made necessary due to ill health.

Kentucky Commission Members Ousted

Under the "Ouster Act" of 1934, Governor Albert B. Chandler of Kentucky discharged the three members of the Kentucky Public Service Commission on December 18.



Daniel Junior Type Orifice Fitting (Above) (Patented)
Daniel Senior Type Orifice Fitting (Right) (Patented)

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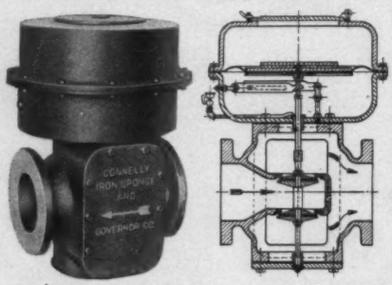
CONNELLY REGULATORS

District—Type LC



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Balanced Valves—with hard or soft seats; Renewable Valve Ports; Double Guided Stem.

FLEXIBILITY:
Connelly District Regulators have adjustable linkages between the diaphragm and valve stem which provide unusual power for valve movement and also permit changes to various ratios of travel to obtain the best operating characteristics. The latter is especially valuable when pressure and volume are altered to meet new conditions.

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PRODUCTS:
Caloroptic BTU Indicator; Regulators for District, Service and Appliance; Back Pressure Valves; U-Gauges; Purifying Materials, mixed or unmixed. Send for Bulletins.

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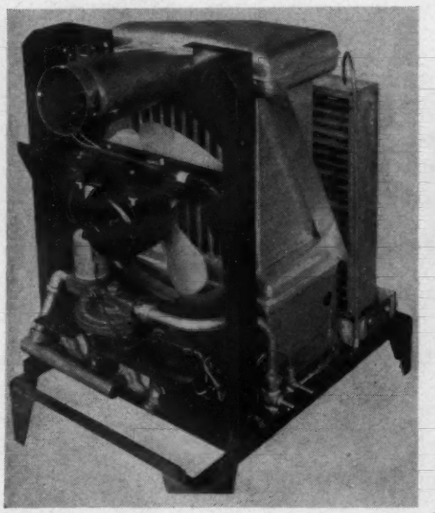
Trane Co. Announces New Heater Unit

THE Trane Co., La Crosse, Wisconsin, announces its new Trane Floorflo heater, developed in conjunction with the Peoples Gas Light and Coke Co., Chicago. The new unit features complete automatic control, ease of installation, and delivery of heat



along floor level, and 85 per cent efficiency is claimed.

The Floorflo has an all aluminum heat exchanger, safety pilot control valve and automatic pilot switch, pressure regulator, automatic supply valve, fans, motors, solenoid control valve and a limit control switch. It is equipped with the Trane Freeflo Grille which directs the heat down to the floor. Provision is made for a humidifier if desired.

The heater is available in either floor or suspension type. The cabinet is made of steel finished in dark brown enamel. The smallest unit has 35,000 B.t.u. capacity.

Gas Engine Generator for School

John Brown School, on the lines of the Arkansas Western Gas Co., has contracted with the Cooper-Bessemer Engineering Corp. to install a 250 h.p. gas engine for the purpose of generating electricity for the school's needs and for its radio station KUOA. Application has been made to the Federal Radio Commission seeking permission to increase the power of the station from 1,000 to 50,000 watts with the view of instituting a "University of the Air."

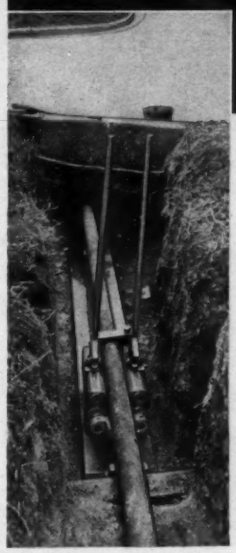
New Office for Balboa Beach

Southern Counties Gas Co., headquartering in Los Angeles, has purchased property and is drawing up plans for the construction of a new sub-district office at Balboa Beach, Calif. The new building will have some 3,200 sq. ft. of office and display space and will cost approximately $12,000.

Frederick, Kan., to Have Gas

The Gas Service Co., with main offices at Kansas City, Mo., was granted a 5-year franchise to serve gas in the town of Frederick, Rice County, Kan. Service is scheduled to begin this winter.

The Greenlee HYDRAULIC PIPE PUSHER Saves Time and Labor In Underground Installation



Above is the Greenlee Hydraulic Pipe Pusher set up for pushing pipe under a paved street. One man, standing in a comfortable position, can exert a pressure of 40,000 pounds on the pipe clamp. Eight speeds are provided for varying soil conditions.

Much time and labor can be saved by using the Greenlee Hydraulic Pipe Pusher, as compared to trenching or using a pusher that requires so much man power to operate. Because of its compact design and by taking advantage of hydraulic pressure, one man can operate the levers and exert the maximum pressure on the pipe clamp.

The Greenlee Pusher is self-contained. It operates on a notched steel base, which can be furnished in various lengths. After forcing the pipe forward 4 inches, the handles are depressed to release the pressure while springs within the body quickly bring the pistons up to a new notch. This operation is repeated until the end of the base is reached, when the machine is moved to the opposite end and the pipe clamp reset.

It will pay you to investigate this improved method of making underground installation of pipe, because of the savings it will make. A letter or post card will bring complete information. No obligation on your part, of course.

Write NOW for Complete Details

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is compressed by
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50 to 1600 horsepower

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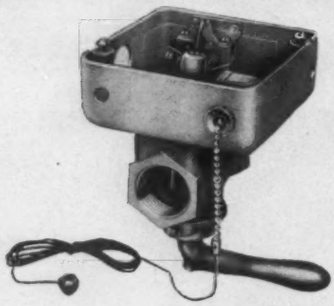

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• Here's a combined gas stop cock and summer switch that will give impetus to your unit heater sales. When gas cock is turned off, pilot and thermostatic controls are automatically cut out. Fan can then be operated for summer ventilation. The Inland Gas Cock Switch is simple, safe and efficient. Write for illustrated folder giving complete details on Gas Cock Switch and other Inland Gas Specialties.

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CUT YOUR POWER COSTS!
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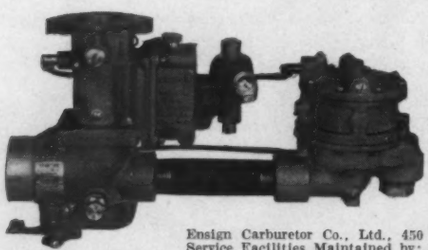

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Dale Elected Vice-Pres. Indiana Service; Mulholland Retires

W. MARSHALL Dale, of Indianapolis, has been named vice-president and general manager of the Indiana Service Corp., succeeding S. E. Mulholland, who resigned from that position to retire after 40 years of continuous service in the utility field. Mr. Dale now is treasurer of the Public Service Co. of Indiana, and is one of its directors. He took over his new duties January 1. Announcement of the election of Mr. Dale by the board of directors was made by John N. Shannahan, president of the corporation.

W. M. DALE

Mr. Dale has been active in the utility field since 1913, when he entered the employ of the Kentucky Utilities Co. He later became manager of its Virginia properties and, in 1920, was made manager of the investment department of that company with headquarters in Louisville.

In July, 1929, on completion of the coordinated operation of the Public Service Co. of Indiana and other public utility and transportation companies in central and southern Indiana, he became treasurer of all companies within the group.

Mr. Mulholland entered the employ of the old Logansport and Wabash Valley Gas Co., a property of the Dietrich-Murdock interests, January 1, 1895, as a general bookkeeper. In 1900 he was transferred to Lima, as manager of what now is the West Ohio Gas Co. In 1908, he was transferred to Fort Wayne to succeed Henry C. Paul as manager of the gas property there. He also became at this time assistant general manager of the other properties of the Dietrich-Murdock interests in Decatur, Bluffton, Wabash, Peru, Logansport, Lafayette, Frankfort, Lebanon and Crawfordsville.

About twelve years later, the United Gas Improvement Co. of Philadelphia, purchased the local property and Mr. Mulholland was continued in charge as vice-president and general manager. He continued to operate these properties after their purchase by the Insull interests in 1925. He also at one time served as vice-president in charge of production of all Indiana gas properties of the Insull interests except those in the northwest corner of the state.

On the death of Robert M. Feustel, president of the Midland United Co. and head of the Indiana Service Corp., Mr. Mulholland took over the management of the Indiana Service Corp., along with the Northern Indiana Public Service Co. property there. For the last year, since the separation of the management of the two utilities he has devoted his time to his duties as vice-president and general manager of the Indiana Service Corp.

He was the second president of the Indiana Gas Association and now is a director of that organization and has served on various committees of the American Gas Association. Mr. Mulholland will continue as a director of Indiana Service Corp.

BUTANE-PROPANE NEWS

California Tax Matters Discussed at Los Angeles Meeting

A group of about 40 liquefied gas industry members met in Los Angeles at the Biltmore Hotel on the afternoon of January 3, to discuss problems which have arisen in California relative to butane-propane taxation, as covered in last month's *Butane-Propane News*. A. N. Kerr, president of the Imperial Gas Co., issued the call for the meeting.

As a result of the meeting a committee was appointed to formulate a request for simplification of tax procedure, to be filed with the State Board of Equalization after being ratified by another meeting of the industry, set for January 17. On this committee are A. N. Kerr (chairman), Imperial Gas Co.; C. D. McGlashen, Shell Oil Co.; L. R. Lackey, Southwest Gas Corp.; C. E. McCartney, Petrolane, Ltd.; and Harley Stevens, Standard Oil Co.

It is hoped that the Board of Equalization will permit bottled gas distributing companies to apply for refund of the 3c per gallon state motor fuel tax, now levied on all liquefied petroleum gas products, rather than requiring such applications from individual bottled gas consumers. This procedure would be applicable to all gas charged into I. C. C. bottled gas containers, when the outlet is controlled to insure ultimate sale at bottled gas price levels. I. C. C. containers are illegal for use as motor vehicle fuel supply tanks, under the California Industrial Accident Commission Liquefied Petroleum Gases Safety Orders, which minimizes any likelihood that bottled gas sold in such containers might be used for motor fuel purposes.

All important producers, bottled gas distributors, and utility companies with bottled gas activities were represented at the meeting, which was presided over by Mr. Kerr.

Butane Service for Mt. Vernon

Following approval of contracts that have been submitted to the Public Works Administration at Washington, construction will commence on a butane gas plant to serve the city of Mt. Vernon, Ind. D. T. Blakey, engineer in charge of the construction, states that work on the plant will be under way within three weeks after Washington approval is given. The plant will be owned and operated by the city and will be designed to serve about 300 meters. The cost of the plant will be around $45,000.

Tank Truck Regulations Pamphlet

A pamphlet entitled: "Regulations for the Design, Construction and Operation of Automobile Tank Trucks and Tank Trailers for the Transportation of Liquified Petroleum Gas," has been issued by the National Fire Protection Association.

Copies may be obtained at 10 cents each from the association's office at 60 Batterymarch St., Boston, Mass.

Emergency Plant Provides Butane-Air for Excelsior Springs Peaks

By H. D. MEUFFELS

Gas Engineer, Missouri Power & Light Company, Jefferson City, Missouri

BUTANE-AIR stand-by equipment has been rendering essential service for the Missouri Power & Light Co., Jefferson City, Mo., since late in 1935 at its Excelsior Springs plant. Excelsior Springs has been served with natural gas since July, 1932, the source being a small, shallow, local field in Clay County, Mo., and one shallow well in Ray County, Mo. This gas had an average heat value of 940 B.t.u., a gravity of .61, and a methane content of 90 per cent.

Due to decline of the local wells it became necessary last October to make arrangements for producing stand-by gas to mix with, or substitute for, the natural gas during peak loads. As a new source of natural gas was to be available in January, 1936, the stand-by installation was to be of temporary nature, with economy a primary consideration.

It was determined to use butane enrichment of blue gas, which is made in a standard 4-foot water gas machine using coke as a generator fuel, both to mix with the natural gas and also to supplant it in the distribution system when necessary.

As the gas plant is located some 2 miles from a railroad siding it was necessary to lay a temporary 1¼-inch screwed steel line on top of the ground to transfer the liquid butane from the tank car to the storage tank at the gas plant. Air pressure from a 100-pound air compressor was used to force the butane from the tank car to storage.

There are three high pressure storage tanks at the gas plant, of 10-foot 6-inch diameter and 49-foot 9-inch length, fabricated of ⅜-inch plate. One of these was converted to liquid butane storage and tested to 125 pounds. This tank has an indicating pressure gauge and a standard manhole. A ¾-inch line connecting the top and bottom of the tank, and fitted with a series of pet cocks, is used for checking liquid level.

A 1¼-inch line delivers the liquid from the bottom of the storage to the vaporizer. The latter consists of a 22-inch welded steel tank 4 feet long. A float valve controls the liquid in the vaporizer. Into this tank a copper coil from a water heater was installed, for use as a steam coil to heat the liquid butane and convert it into vapor.

From the top of the vaporizer the gas passes through a 1½-inch gas pressure regulator, reducing an inlet pressure of 70 pounds to 2 ounces. From this regulator the vapor passes into a welded steel expansion tank which is equipped with a pressure and vacuum relief and U-tube for indicating pressure.

From the expansion tank the butane vapor is delivered through a 2-inch line tying into a 2½-inch line which comes directly from the large holder, and delivers the blue gas. A needle valve in the 2-inch delivery line controls the amount of butane vapor delivered; also a 2-inch flanged union into which a ¾-inch orifice has been placed. By calibrating this orifice and measuring the drop across it, the quantity of butane vapor can be varied according to the amount of blue gas used.

From the point where the blue gas and butane gas lines are tied together both products are piped to the inlet of two single stage compressors, size 7-inch by 6-inch, 370 R.P.M., belt connected to 10 H.P. induction motors, having a combined capacity of 9,000 cubic feet per hour. These compressors delivering the finished gas to the two high pressure storage tanks. From the storage tanks, the gas is delivered, through a regulator, to the distribution system.

Two sampling lines extend into the laboratory, one from the discharge line from the compressors and one from the low pressure side of the regulator feeding into the distribution system.

It was determined a 900 B.t.u. mixture was best suited for our use in mixing or substituting for 940 B.t.u. natural gas. This mixture is 21.50 per cent butane and 78.50 per cent blue gas. The finished product has a dew point at 40° at 60 pounds and a specific gravity of .85. This mixture is working satisfactorily and it is not necessary to change adjustments on customer appliances when mixing with natural or using straight 850 to 900 B.t.u. butane-blue gas mixture in the system.

Excelsior Springs has a population of 4,600 and there are 765 gas customers. The distribution system includes steel and cast iron pipe in sizes 1¼- to 8 inches, there being 12 miles of pipe with 10.5 miles of 3-inch equivalent mains. The daily delivery averages about 140 M c.f., with a maximum hour during peak load of 18 M c.f. At present about 50 M c.f. of butane-blue gas is being used in the system daily.

Gas Chemist Seeks Connection

A gas chemist with seven years experience in research in the gas industry is desirous of securing a position as gas chemist or analyst that affords opportunity to do research on problems relating to gas. He is experienced in every phase and method of gas analysis, including Podbielniak fractionation, and has been in charge of a gas laboratory for six years. *Western Gas* will be glad to forward inquiries to the applicant.

KEROTEST
tested and proved
FORGED BRASS
CYLINDER VALVES
and S. A. E.
FLARE FITTINGS
for
PROPANE
BOTTLED GAS
SERVICE

Write for descriptive circular
KEROTEST MFG. CO.
PITTSBURGH, PA.
KEROTEST

200-Mile Butane-Propane Line to Baytown Projected

INVOLVING construction of a 200-mile line for transportation of liquefied petroleum gases and natural gasoline from East Texas fields to the Baytown refinery of Humble Oil & Refining Co., a contract has been reported between the above company, Humble Pipe Line Co., and Hanlon-Buchanon, Inc., which is unique in butane-propane developments.

Extraction of butane-propane, and natural gasoline in the East Texas fields, covered in the agreement, means addition of special equipment at natural gasoline plants of Hanlon-Buchanon, Inc., and several affiliated companies, laying of gathering lines by the same interests, and delivery to Humble Pipe Line at a point near the latter's London gasoline plant.

Humble Pipe Line, under the plan, would then lay an 8-inch line some 200 miles to the Baytown refinery, the line to deliver around 9,000 barrels of 55 to 60 vapor pressure product for fractionation at the refinery. The butane-propane would be used by Humble as charging stock for a new polymerization unit, while Hanlon-Buchanon's natural gasoline would go into export trade.

An eventual capacity of 17,000 barrels daily is proposed for the line. Laying of the all-welded carrier is understood to be programmed for completion in the next three months, Humble spending around $1,000,000 on the line and a pump station at the London plant. Some of the pipe will be reclaimed from unused oil lines, as the line will follow the route of the existing Humble crude oil system to Baytown.

Butane-Air Standby Installation at Grass Valley

REVIVAL of gold mining activity at Grass Valley and Nevada City has brought a near boom in business to these two California communities, which Pacific Gas and Electric Co. serves from the same oil gas plant, located at Grass Valley. The towns are 4 miles apart and together have about 1,100 customers.

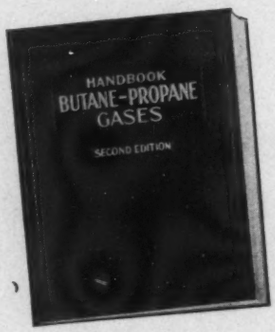
Installation of butane-air standby was completed at the Grass Valley plant in December. The oil gas equipment consists of two generators, one of 16 M c.f. hourly capacity, the other 12 M c.f. Repairs are planned on the larger set, which will soon throw the load on the smaller, and since there was possibility that its capacity would be inadequate for the enlarged demand, butane was selected for reserve capacity.

Two units of the Gasair equipment, manufactured by Utility Development Co. of San Francisco, were installed at the inlet of the storage holder. Butane-air will be served in mixture with oil gas, not to exceed 50 per cent butane-air, as load conditions demand. Each Gasair unit is of 2,500 feet hourly capacity.

A 6,000-gallon storage tank for liquid butane was also installed at the Grass Valley plant.

An odd load condition exists on this plant, demand being heaviest during the summer due to the fact that the heating saturation is low.

THE ONLY
HANDBOOK OF
BUTANE–
PROPANE
GASES



Big Second Edition
Now Available

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$5.00—Send Check or Money Order To

WESTERN GAS, *Publishers*
810 South Spring St.
Los Angeles, California

Cylinder Testing to be Reviewed at C.G.M.A. Meeting

At the annual meeting of the Compressed Gas Manufacturers Association to be held at the Waldorf-Astoria in New York, January 20 and 21, the subject of cylinder testing will be reviewed during the Technical Sessions on the afternoon of January 21. The Association has invited questions bearing on cylinder testing to be sent in that they might be covered in the discussion.

The annual meeting of the National Bottled Gas Association will be held January 23, following the C. G. M. A. sessions.

Union System Properties Consolidated

Union Gas System, Inc., as of December 1 took over the utility functions of its subsidiaries, the Union Gas Co., Pioneer Pipe Lines, Inc., and the Osage Gas Producing Co. Vernon F. Palmer, vice president of Pioneer Pipe Lines, Inc., has become manager of the pine line department of the Union Gas System, and F. L. Rupp, vice president of Union Gas Co., manager of the distribution department of the Union Gas System.

Connelly Iron Sponge & Governor Co. New Caloroptic Development

CONNELLY Iron Sponge & Governor Co., of Chicago, Ill., and Elizabeth, N. J., has recently extended the application of the Connelly Caloroptic. As originally designed the Caloroptic served only as a B.t.u. indicator for various kinds of gases. In 1934 Connelly placed on the market the Caloroptic equipped with a phontronic cell which controlled a distant signal and alarm system that could be applied to any kind of gas but was especially serviceable on mixed gas for instant indication by lights and alarms if the B.t.u. value of the gas departed from the set range.

The latest development is applied especially to butane-air gas plants. It includes the Caloroptic fitted with the distant signal and alarm system which incorporates a controller, designed to automatically shut down the mixing equipment in case the B.t.u. content exceeds the predetermined low or high limit for which the unit was set..

New Gas-Fired Air Conditioning Unit Utilizes Butane for Refrigerant

Paul M. Raigorodsky, manager of Petroleum Engineering, Inc., Tulsa, Okla., working in cooperation with Oklahoma Natural Gas Corp., has developed an absorption type year-round air conditioning unit designed to operate on natural gas.

When used as an air conditioning unit in the summer, refrigeration is provided by the expansion of butane in an absorption cycle in which decane is used as the absorbent. The construction of the unit is such that one installation properly situated can supply air conditioning to several homes. The new contrivance provides for automatic filtration, humidification and temperature control, and has a minimum of movable parts.

Crane and Stevens Appointed Cutler-Hammer Vice-Presidents

G. S. Crane, sales manager of Cutler-Hammer, Inc., has been advanced to vice-president in charge of sales and W. C. Stevens, chief engineer, to vice-president in charge of engineering.

Mr. Crane entered the service of the company in its engineering department over 25 years ago, was later transferred to the sales department and served as manager of the Cleveland office, and 12 years ago became sales manager with headquarters in Milwaukee. Mr. Stevens entered the engineering department 30 years ago, spent 18 years in the sales department to return to engineering in 1924, and has been chief engineer for the past several years.

New Peoples Water and Gas Co. Buys Miss. and Florida Properties

Following recent acquisition of gas producing and distributing facilities at Meridian and Columbus in Mississippi and Miami Beach and Fort Lauderdale, Florida, the Oregon-Washington Water Service Co., has changed its name to Peoples Water and Gas Co., according to H. K. Griffin, general superintendent. The executive offices of the company have been moved to 27 Williams St., New York City.

TWICE AS MANY IN SERVICE

Twice as many Hackney Liquefied Petroleum Gas Cylinders in service as all others combined. Or, put it another way—every time a Liquefied Petroleum Gas Cylinder is used—two to one it will be a Hackney cylinder.

Domination of this market has been won by the superior design and construction of Hackney Liquefied Petroleum Gas Cylinders—which were built by Hackney from the first development of these products.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg., Room 1185, Chicago, Ill.
1363 Vanderbilt Concourse Bldg., New York, N. Y.
6633 Greenfield Ave., Milwaukee, Wis.
666 Roosevelt Bldg., Los Angeles, Calif.

Hackney MILWAUKEE

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

JOHNSON AUTOMATIC HAND TORCH

The Johnson No. 18 Hand Torch is strong, lightweight, and perfectly-balanced for easy handling. The automatic valve is operated by the hand which holds the torch, hence torch may be instantly turned on or off. Inexpensive and efficient. Write for free catalog.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Western Representative: C. B. BABCOCK CO. 135 Bluxome Street San Francisco, Calif.

Eastern Representative: J. H. McPHERSON 250 Stuart Street Boston, Mass.

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Managing Director
(P. C. G. A.)

Volume 8, No. 1 *Eighth consecutive year of regional cooperative advertising, Pacific Coast Gas Association* January, 1936

COOP. ADVERTISING WILL CONTINUE FOR EIGHTH CONSECUTIVE YEAR

President H. M. Crawford of P. C. G. A. Announces Approval of Plan with Important Revisions

Continuing the Gas Industry's cooperative regional advertising, carried on "without a break" since 1929, the Pacific Coast Gas Association will sponsor a series of magazine advertisements during 1936.

In line with changing conditions, trade journals serving heavier industries have been eliminated in favor of a new plan emphasizing domestic consumption.

PROMOTING WATER HEATER SALES
This full-page advertisement appears in full color on the back of January "Sunset" Magazine, and (in black-and-white) in parent-teacher and club women's magazines.

Domestic advertising will be strengthened with 12 full pages in Sunset Magazine (circulation over 200,000), and further extended by the use of parent-teacher and club women's publications.

Advertising to architects and builders will continue in *Architect and Engineer* and *California Arts and Architecture*, both of which will carry 12 full pages; and *California Homes*, a new publication, distributed widely by the Federal Housing Administration and cooperating banks.

Hotel and restaurant men will be told about gas in *Pacific Coast Record and Western Restaurant, Western Hotel Reporter* and *Keeler's Pacific Hotel Review*, all of which will carry 2/3-page advertisements.

Recognizing the importance of the appliance dealer in building profitable domestic load, the Committee has scheduled complete campaigns in both *Western Furniture Retailing* and *Western Plumbing and Heating Journal*.

In recognition of improved business conditions, renewed activity in building, increased demand for gas appliances and brighter prospects than have prevailed for some years, Gas Company executives have enlarged the appropriation to allow expansion in the domestic field and strengthening of advertising in other classifications as outlined above.

26 Million Contacts

All told, the publications which will carry this advertising have a circulation in gas territory exceeding 300,000. The ads will make approximately 26,000,000 reader contacts during the year.

MESSAGE TO APPLIANCE DEALERS
Reduced facsimilie of full-page advertisement in January "Western Furniture Retailing."

"Al" Joy Again Heads Cooperative Committee

The 1936 P. C. G. A. advertising will be prepared under the direction of a committee, of which A. C. Joy, manager publicity department, P. G. & E., is chairman. Other advertising men on this Committee are: J. S. Spaulding, L. A. G. & E. Co.; Douglas Buckler, So. Calif. Gas Co.; Walter Thurber, So. Counties Gas Co., and Forrest Raymond, San Diego Cons. G. & E. Co.

NEW ENGLAND PIE COMPANY
Oakland, California
"Gas saves 10 minutes on each bake"
TIME SAVED is money earned, yet that is only one of the economies of GAS, the Modern Fuel.
The New England Pie Company pronounces gas superior to previous fuels on every count.
According to H. C. Hotchkiss, owner, gas is cleaner, quicker and more convenient and provides a higher temperature, under more uniform control, "Baking temperature is now reached so quickly that we save fully ten minutes on each bake. On 15 to 18 bakes in the Dutch oven unit alone, there is a daily saving of two and one-half hours or more."
With an average daily output of 2,000 pies—a peak of more than 6,000 just before Thanksgiving—the extra speed of gas quickly becomes extra profit for "New England."
Whether you bake for the wholesale or retail trade, there is modern gas-fired equipment exactly fitted to your needs. Get comparative facts and figures from your Gas Company. This technical service is FREE.
CLEAN
CONTROLLABLE
ECONOMICAL
DEPENDABLE
QUICK
Gas
PACIFIC COAST GAS ASSOCIATION, INC.
447 SUTTER STREET . . . SAN FRANCISCO, CALIFORNIA

GAS SAVES BAKERS' TIME
This message, featuring an Oakland, Calif. pie factory, emphasizes the speed of gas. (January issue, "Western Baker and Pacific Baker.")

Utilities Pay Cost of Entire Campaign

This cooperative regional advertising is financed entirely by Pacific Coast gas companies, without one cent of cost to appliance manufacturers or dealers. Each advertisement directs the public to "your local appliance dealer or gas company."

Gerth-Knollin Appointed

Jas. C. Knollin, one of the partners of the Gerth-Knollin Advertising Agency of San Francisco, who has prepared the cooperative advertising under the Committee's direction since its inception, continues to serve the Assocation this year. Jas. R. Ferguson, Account Executive of the agency, will continue to direct The News Service, which has placed an average of 125 gas articles annually.

With the ASSOCIATIONS

A.S.T.M. Committee for Standardization Research on Gaseous Fuels

A COMMITTEE of Gaseous Fuels, D-3, of the American Society for Testing Materials, was recently organized for the purpose of conducting research on gaseous fuels with the objective of developing standard requirements. The advisory board of the committee is composed of A. C. Fieldner, of the Bureau of Mines, chairman; R. B. Harper, the Peoples Gas Light and Coke Co., vice-chairman; R. M. Conner, A.G.A. Testing Laboratories, secretary; Dr. G. G. Brown, University of Michigan, representing general interests; J. V. Freeman, United States Steel Corp., representing consumers' interests; and G. G. Oberfell, Phillips Petroleum Co., representing producers' interests.

Seven sub-committees have been formed to carry on the active work of the committee. These sub-committees and their chairmen are as follows:

Collection of Gaseous Fuel Samples, S. S. Tomkins, Consolidated Gas Co. of New York.

Measurement of Gaseous Fuel Samples, Wm. M. Deaton (tentative), Bureau of Mines Experiment Station, Amarillo.

Determination of Calorific Value, R. B. Harper, vice-president Peoples Gas Light and Coke Co., Chicago.

Determination of Specific Gravity and Density, Carl D. Ulmer (acting), Koppers Construction Co., Pittsburgh.

Determination of Impurities, W. P. Yant, Bureau of Mines Experiment Station, Pittsburgh.

Determination of Water Vapor Content A. W. Gauger, Mineral Industries Research, Pennsylvania State College.

Complete Analysis or Chemical Composition, Dr. Martin Shepherd, National Bureau of Standards.

Home Service Committee Program for 1936 Outlined

At a meeting of the Home Service Committee of the Commercial Section of the A. G. A., held at Bellevue Stratford Hotel, Philadelhpia, Pa., on November 22, Beatrice Cole Wagner, committee chairman, presented the plan of work that will be carried on by the Committee in 1936. The plan is outlined to cover the following general headings: (1) home service operation, (2) sales promotion, (3) regional organization, (4) education, (5) time and temperature study, (6) apprenticeship, and (7) A.G.A. Laboratory research.

Second Annual Welding Conference at Texas Technological College

Texas Technological College, Lubbock, will conduct its Second Annual Welding Conference February 13 and 14, according to J. C. Hardgrave, of the Department of Mechanical Engineering. Among topics that will be discussed are "Multiple-Flame Welding," "Economy in Quality Welding Through Personal Training," "Identification of Metals to be Welded," "Welding of Farm Implements," "Some Recent Developments in Silver Solder and Brazing," "Barrel Welding," "Hard Surfacing," "Welding in Plant Rehabilitation," and "Seam and Spot Welding."

Morning sessions will be devoted to lectures and motion pictures, and afternoons to exhibits and demonstrations. All persons interested are invited to attend.

Three Regional Sales Conferences Scheduled for February

THE regional sales conferences sponsored by the Commercial Section of the American Gas Association will be held during February as follows, according to word received from J. W. West, Jr., secretary, Commercial Section:

Eastern Natural Gas Sales Conference, Wm. Penn Hotel, Pittsburgh, Pa., February 6-8; Geo. L. Scofield, Republic Light, Heat and Power Co., Buffalo, N.Y., chairman.

Mid-West Regional Gas Sales Conference, Sherman Hotel, Chicago, February 13-15; H. J. Dropp, Milwaukee Gas Light Co., Milwaukee, Wis., chairman.

Southern-Southwestern Regional Gas Sales Conference, to be held in conjunction with the annual meeting of the Southern Gas Association, Roosevelt Hotel, New Orleans, February 19-21; C. B. Wilson, Little Rock (Ark.) Gas & Fuel Co., chairman.

A. G. Widden Elected President of Arkansas Utilities Association

AT the 25th Annual Convention of the Arkansas Utilities Association, held at Hot Springs, Ark., November 25 and 26, A. G. Widden, director of public relations of the Arkansas Power and Light Co., was elected president of the Association. Paul Clay, manager of Arkansas Natural Gas Co., was elected first vice-president; James Hill, general manager of Arkansas-Missouri Power Co., second vice-president; and R. L. Ritchie, assistant to the president of Arkansas Power and Light Co., secretary-treasurer.

The 25th Convention was the Association's first meeting in four years.

Iowa Public Utilities Association Moves to Cedar Rapids

Headquarters office of the Iowa Public Utilities Association has been transferred from Des Moines to Cedar Rapids, according to Sutherland Dows, president. Charles Dauchy, new secretary and treasurer of the association and rate engineer of the Iowa Electric Light & Power Co., is in charge of the office. Mr. Dauchy's appointment follows the retirement necessitated by ill health of Joe Carmichael who has been managing director at the Des Moines office for a number of years.

1936 Calendar

January

Compressed Gas Manufacturers Association—Annual Meeting, Waldorf Astoria, New York City, January 20, 21.

National Bottled Gas Association—Annual Meeting, New York City, January 23.

American Society of Heating and Ventilating Engineers—Annual Meeting, Palmer House, Chicago, Ill., January 27-30.

National Warm Air Heating and Air Conditioning Association—Convention, Hotel Stevens, Chicago, Ill., January 27-30.

February

Eastern Natural Gas Sales Conference (A.G.A.)—Wm. Penn Hotel, Pittsburgh, Pa., February 6-8.

Mid-West Regional Sales Conference (A.G.A.)—Sherman Hotel, Chicago, Ill., February 13-15.

Southern Gas Association—Annual Meeting, Roosevelt Hotel, New Orleans, La., February 26-28.

Southern-Southwestern Regional Gas Sales Conference (A.G.A.)—Roosevelt Hotel, New Orleans, La., February 26-28.

April

Mid-West Gas Association—31st Annual Convention, Minneapolis, Minn., April 13-15.

Missouri Association of Public Utilities—Annual Convention, Jefferson Hotel, St. Louis, Mo., April 29, 30 and May 1.

May

Natural Gas Department, American Gas Association—Annual Spring Meeting, Hotel Baker and Hotel Adolphus, Dallas, Texas, May 5-8.

International Petroleum Exposition and Congress—Tulsa, Okla., May 16-23.

July

Canadian Gas Association Annual Meeting, and *Pacific Coast Gas Association,* Northwest Conference, Hotel Vancouver, Vancouver, B. C., July 8-10.

October

American Gas Association—18th Annual Convention, Atlantic City, N. J., week of October 12.

Coast Cooperative Advertising Opens Eighth Successive Year

Entering its eighth consecutive year of cooperative advertising, the Pacific Coast Gas Association last month released details of its 1936 program, as covered on the opposite page. The P.C.G.A. advertising is the most sustained effort of its kind in the industry.

7 Reasons
FOR SUPERIORITY
Payne "A" Gas Vent

• 1 •

The inner Aluminum tube is constructed of 99% pure aluminum, made especially for Payne "A" Gas Vent. Laboratory tests prove that acid sometimes set up through products of combustion of gas is not a corrosive agent so far as this pure aluminum is concerned.

• 2 •

Rapid heating of inner tube assures hot stack immediately, consequently more perfect draft and quicker and better combustion of gas fuel.

• 3 •

Aircell insulation around inner tube prevents heat loss and cooling of products of combustion. A constant stack temperature is maintained.

• 4 •

Outer galvanized iron casing is a protection to inner pipe and insulation and gives rigidity against earth shock or vibration.

• 5 •

Because of its light weight Payne "A" Gas Vent is installed with greater ease and the shipping cost is considerably less. There is positively no breakage.

• 6 •

Payne "A" Gas Vent is listed by the Underwriters' Laboratories under Reexamination Service (File MH 2694). Also has the Recommendation Sanction of the Pacific Coast Building Officials Conference.

• 7 •

An orange spiral marking is used for prompt identification and is being copyrighted for the protection of those interested in proper venting of gas burning appliances.

Only products listed by the Underwriters' Laboratories under Reexamination Service are entitled to use the above seal, which is stamped on each section of Payne "A" Gas Vent Pipe.

PAYNE FURNACE & SUPPLY COMPANY
Beverly Hills, California

Sales Department Changes Made by P. G. & E.

A NUMBER of organization changes affecting the headquarters staff of the Pacific Gas and Electric Co.'s sales department, which have been in effect on a tentative basis for the past year, bid fair to prove permanent as a result of their successful operation in 1935. The sales department falls under the executive supervision of R. E. Fisher, vice-president in charge of public relations and sales, with H. M. Crawford directly responsible for the sales program as general sales manager.

Under the former organization scheme the three general functions of gas sales, electric sales, and agricultural sales came under the specialized direction of three sales managers, each following his program into all divisions of the company. The new set-up gives responsibilities for the combined sales program —gas, electric, and agricultural—to each of the former specialized sales managers, now known as division sponsors.

The company system has been divided into three sections of equivalent populations, each falling under a separate division sponsor for purposes of the sales program.

F. U. Naylor, formerly manager of gas sales, now is division sponsor for the North Coast area, made up of San Francisco, North Bay and Eureka Divisions.

South Coast territory, including Coast Valleys, San Jose and East Bay Divisions, is assigned to Harry N. Carroll, formerly manager of electric sales.

A. M. Frost, formerly manager of agricultural sales, is now division sponsor for the Central Valley section, composed of the Sacramento, San Joaquin, Drum, Colgate, Desable, and Shasta Divisions.

The three division sponsors are chiefly charged with the execution of the sales program in their respective districts. A staff of specialists is now serving as a Sales Planning Committee, in addition to filling special field assignments. In the sales planning capacity this committee jointly sets up campaigns for the system and also for special local effort. The division sponsors sit in the committee conferences, and after campaign recommendations have had executive approval the sponsors carry them to division managements for execution. On the Sales Planning Committee are the following:

Rodney Doerr (secretary), J. H. Gumz (industrial gas specialist), J. A. Hill (commercial gas heating), A. C. Miller (domestic gas and electric sales), W. H. Park (electric power), Bert Reynolds (dealer representative).

The Sales Planning Committee reports directly to Mr. Crawford as general sales manager.

Another new group within the sales department, functioning to produce the data needed in sales planning and direction, is the Promotional Research Bureau. This is made up of John Wrenn (director), W. P. Bear, J. F. Aicher, and J. C. Manchester. Its duties fall into three general classifications—market survey and analysis, cost accounting for the sales department, and furnishing special data for the planning committee.

On another page will be found a review of sales in P. G. and E. territory for 1935 and an outline of the company's sales program for the year ahead.

P.C.G.A. Distribution Committee Studies for Current Year Announced

OTTO Goldkamp of San Diego Consolidated Gas and Electric Co., who is this year's chairman of the Distribution Committee, Technical Section of the Pacific Coast Gas Association, announces that the following studies will be among those made by his committee:

Test Results of Leakage in Bell and Spigot Joints; Cast Iron Pipe vs. Humidity—a paper by C. P. deJonge, San Diego Consolidated Gas and Electric Co.

Breaking In Meters Before Adjustment—a committee study, H. S. Harris, Los Angeles Gas and Electric Corp., chairman; C. W. Capwell, San Diego Consolidated Gas and Electric Co.; Guy Corfield, Los Angeles Gas and Electric Corp.; B. Devine and F. H. Winslow, Southern Counties Gas Co.; Frank Honberger, Southern California Gas Co.; and R. M. Stewart, Pacific Gas and Electric Co.

Investigation of the Possibilities of Developing a Universal Pilot Light for Domestic Appliances—a paper by C. Eldon White and Chas. Stewart, San Diego Consolidated Gas and Electric Co.

House Pipe Design and Domestic Regulator and Meter Capacities vs. Coincident Demand—a paper by N. L. Hoff, Los Angeles Gas and Electric Corp.

The Effect of Varying Humidity in the Distribution System on Domestic Gas Meter Accuracy—a paper by C. W. Capwell, San Diego Consolidated Gas and Electric Co.

Pressure Telemetering and Remote Control—a paper by W. A. LaViolette, Pacific Gas and Electric Co.

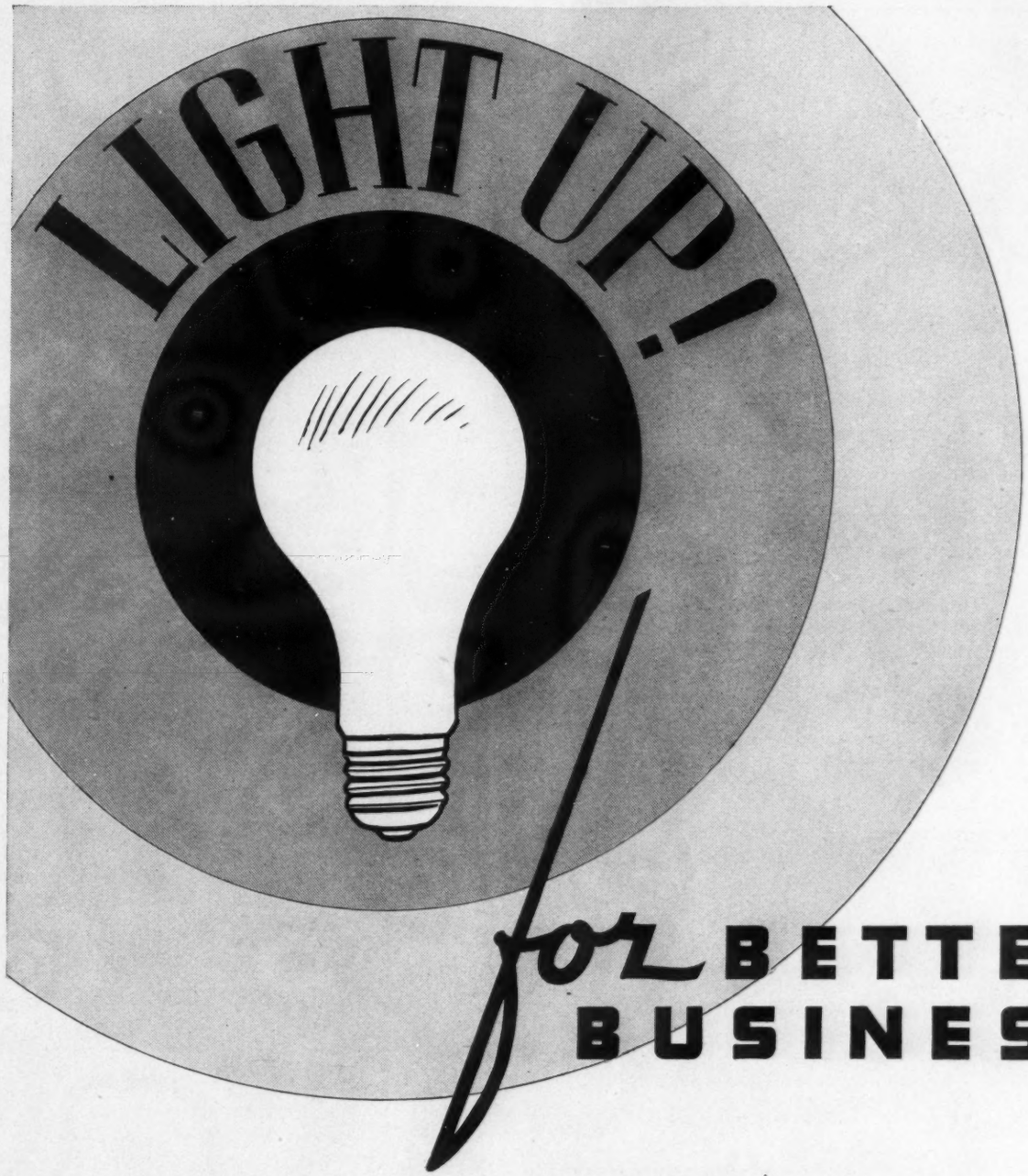
A.G.A.E.M. Bulletin First Issue Published in December

DECEMBER saw the publication of Vol. I, No. 1, of the "Association of Gas Appliance & Equipment Manufacturers Bulletin," which will henceforth be published monthly, as announced by W. T. Rasch, American Gas Products Corp., president of the recently formed association. This first issue sets forth the purpose of the association and contains the list of A.G.A. E.M. officers and members, as well as features and news material.

The Bulletin also announces that A.G.A. E.M. directors have resolved that exhibition facilities will be provided at the 1936 A.G.A. Convention to be held in October in Atlantic City.

Texoma Natural Installing More Compressors

Texoma Natural Gas Co. is installing three additional 1250 h.p. compressor units in its Fritch booster station in Hutchinson County in the Texas Panhandle, according to news reports.



Effective at once, Commercial Lighting rates are reduced throughout the P. G. and E. system. Phone or call at our local office for a handy table of savings. While you're thinking about these savings, give a thought to your present lighting facilities. Bear in mind the tremendous strides made in store and office lighting during the past few years. Ask yourself if your own equipment is really modern, or even adequate, measured by present-day standards. If you have any doubt about it, we'll gladly make a Sight-Meter test without charge. It's quite possible that your savings under the new rates would take care of what additional light you need. Find out, anyway.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

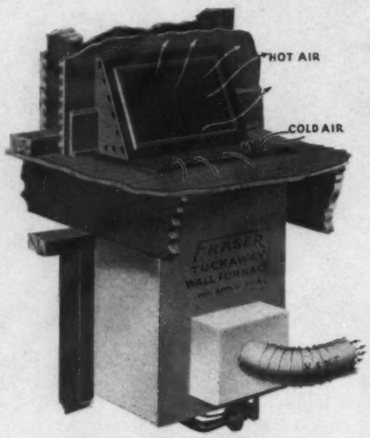
PATENTED

Guaranteed to Run With Wet or Dry Gas Ammonia For One Entire Season

Accordion Packing Ring Sets are built for any make of compressor to handle ammonia under all conditions. The rings are made of materials which are not affected by dry gas ammonia or aqueous ammonia, and are guaranteed to run for one entire season. For additional information write for Technical Bulletin No. 390.

THE TEXACONE COMPANY
INCORPORATED IN TEXAS
MANUFACTURERS OF
High Pressure Packing and Specialties
2007-9 W. Commerce DALLAS, TEXAS

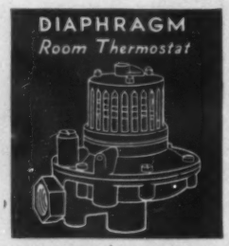
FRASER
TUCK-A-WAY



An entirely new idea in Furnace Construction
Made in 4 sizes

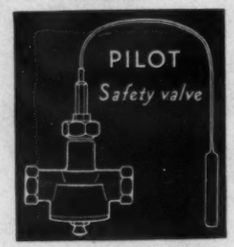
Manufactured by
Fraser Furnace Company
Stockton, Calif.
Distributed by
H. R. Basford Company
San Francisco Los Angeles

BUILD YOUR HOUSEHEATING LOAD WITH KLIXON CONTROLS



These two advanced Klixon devices give exact automatic temperature control and assure positive pilot protection for your gas-fired space heaters . . . provide sales features that make it easy to sell gas heating.

Write today for descriptive bulletins.



SPENCER THERMOSTAT COMPANY
Unit of Metals & Controls Corporation
34 FOREST STREET • ATTLEBORO, MASSACHUSETTS

A. G. A. Approved

A
PEERLESS
RADIANT GAS HEATER

It is a practical as well as attractive Holiday Gift.

Many Designs to Select From

WRITE FOR LITERATURE

PEERLESS MANUFACTURING CORP.
1400 W. ORMSBY
LOUISVILLE, KENTUCKY

MODERN METHODS AND MATERIALS

A letter to WESTERN GAS will bring you any of the selected reference bulletins listed below, without cost. Indicate by number which you desire.

NO. 98—ARC WELDING

Manual giving late developments in arc welding practice. Specifications on equipment, materials and accessories for electric welding operations.

NO. 99—JOINT SEALING MATERIAL

Illustrated bulletin describing properties and applications of a joint sealing and gasket material, listing coeffients and limits.

NO. 100—PRESSURE REGULATORS

Catalogue containing tables for sizing a line of high pressure dead weight type of regulators, with cut-away illustrations.

NO. 101—TRUCK SERVICE RECORDER

Booklet discussing efficient management of truck fleets and showing use of recording device and charts.

NO. 102—BOILERS, WATER HEATERS

Pamphlet covering line of conversion burners, boilers, water heaters and relief valves. Contains list of prominent installations and list of company branches.

NO. 103—B.T.U. INDICATOR

Loose-leaf insert giving detailed description of apparatus for indicating heat content of any kind of gas directly in B.t.u.'s. Contains instructions for installation, calibration, remote indicating, etc.

NO. 104—GAS CARBURETOR

Leaflet on a gas carburetor designed for Ford V-8 motors. Describes operation, adjustments, etc.

NO. 105—GAS SPECIALTIES

Folder listing gas specialties such as gas unit heater hanger, gas cock switch, adjustable external lighter and extension, safety gas cock, fire pot coils, furnace door closer, etc.

NO. 106—PIPE AND TUBING

Pocket size booklet listing complete line of welded steel pipe, iron pipe, boiler and condenser tubing, special steel tubular shapes, etc.

NO. 107—CONTROL SYSTEMS

A 35-page pamphlet illustrated with color diagrams, photographs and charts covering a line of control systems for regulating temperature, pressure, flow and liquid level.

NO. 108—GAS FILTERS

Folder covering a line of gas filters for use on individual appliances and house service lines. Illustrated with cross section drawings, describes construction and operation and contains tables for sizing.

The Heating Plant

(Continued from Page 16)

primary purpose of baffling is to direct the travel of flue gases to as much heating surface as possible, and that baffling increases the resistance through the flue passages and if done to any great extent, will change the consideration for sizing the flue pipe and draft hood.

When draft hoods of the type illustrated herewith are used, much can be done to eliminate the necessity of baffling by controlling the secondary air at the flue outlet.

Causes for Excessive Heating Cost

When gas heating equipment does not operate satisfactorily or the customer finds difficulty in getting the desired results with his equipment, particularly as to operating cost (and this applies to gas-designed as well as to conversion equipment), many times the approach to the problem is through the gas appliance itself and the various possibilities of causes of difficulties traceable to the heating plant itself are too often overlooked.

To illustrate, the following summary of various reasons contributing to higher cost than necessary is given to point out the possibilities for improvements rather than for the purpose of listing what is bad:

BOILER *(Hot Water or Steam)*

Boiler too small or too large for required input.
Boiler has scale, rust or grease in it.
Firepot and flue passages are dirty.
Inefficient design (four-section, etc.).
Boiler not baffled where conditions warrant.
Boiler not insulated.
Air leaks at base section of boiler allowing excess secondary air.
Too high a water line carried.
Water coil or heat exchanger installed.
Continuous leaking from control valve.

FURNACE *(Warm Air)*

Firepot and flue passages dirty.
Warm air ducts taken from only one side of bonnet.
Input and blower capacity not balanced where forced air is used.
Air leaks in base of furnace allowing excess secondary air.
Water coil installed.
Cold air return connected too high causing poor air circulation.
Furnace too small or too large for required input.
Filters stopped up on forced air jobs.
Furnace of inefficient design.
Heat applied too low in ashpit, causing cold air return to become warm and result in poor air circulation.

FLUE AND DIVERTER

Draft control failing to break draft.*
Flue connected to wrong outlet.
Draws too much air from basement.
Flue too large causing excess secondary air and stack loss.
Direct flue outlet dampers open or not sufficiently sealed.
Chimney draft drawing excess air out of basement through draft diverter.

*In some instances this device is used as a substitute for a draft hood where draft hood cannot be installed, but it should be borne in mind that it does not serve as a substitute for a draft hood.

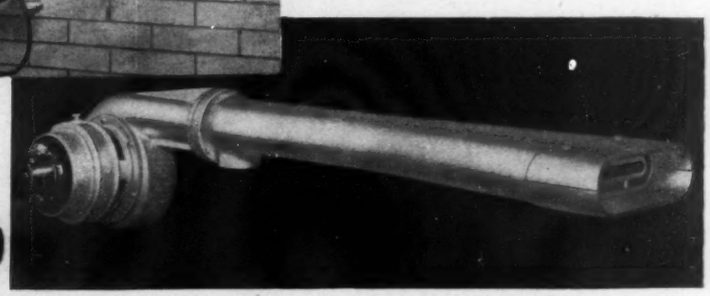
The Burner for the Baker who wants to save Time, Fuel, Labor

Developed by engineers, thoroughly familiar with bake oven design and operation, the N. G. E. Type GA bake oven burner will effect considerable economy for bakers in these all-important items: space, fuel, time and labor. It is particularly suited to installation in the direct fired, inside-furnace or "Dutch" oven.

Note, from the illustration below, the ease with which this burner may be swung into firing position and pointed to any cold corner of the oven just like a gun; and how, as a result, proper heat can be "shot in" to get perfect baking results. Remember, that it's simple to adjust and has a dial valve which permits exact settings.

And here are features that can't be photographed—its uniform heat distribution, its perfect combustion, its large reserve burner capacity, its economy in fuel consumption—all are items that are inherent in this N. G. E. design; all are items that guarantee production economies that can be accounted for in dollars and cents.

An N. G. E. Bulletin completely describes the many features of this type GA bake oven burner. This Bulletin is complete with specifications, detail drawings and tabulated material showing how ideally this type burner may be adapted to your particular requirements. Requests for copies will receive prompt attention.



THE N. G. E. TYPE GA BAKE OVEN BURNER

NATURAL GAS EQUIPMENT INC.

1123 Harrison St. San Francisco — Petroleum Securities Bldg. Los Angeles — Arizona Distributors Crane Co.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

AIR CONDITIONING
Electrogas
HEATING EQUIPMENT

FURNACES BLOWERS FILTERS WASHERS

Write for attractive Dealer proposition

ELECTROGAS FURNACE & MANUFACTURING CO.
2575 Bayshore Boulevard, San Francisco

Natural Gas Efficient Fuel for Lime Burning

(Continued from Page 19)

bottom of each eye. These simply consisted of 3-inch pipe about 30 feet long, open at one end and capped at the other end with a shutter arrangement for admission of primary air. Gas was admitted to these tubes by means of a ¾-inch pipe which was projected through the center of the 3-inch pipe cap. The ¾-inch pipe was capped and drilled to allow for maximum capacities at 2 pounds pressure, which was all that was available. Only about 20 per cent primary air was used, the remainder coming up through the grate from the ashpit. The gas and secondary air met and mixed at the entrance to the kiln.

This method of firing proved to be a failure for many reasons, the most important ones being:

1. Slagging of refractories which was due to high flame temperatures coupled with the tendency of the flue gases to travel up the side walls since the course of least resistance is offered there.

Although the temperatures in the kiln seldom exceeded 2400° F. and a good quality fire brick will withstand this temperature, difficulty with slagging resulted because of the chemical action of the basic lime and acid brick which formed a compound that fused very easily at approximately 2350° F. in this particular case.

2. A non-uniform product was obtained, overburnt lime and underburnt lime being drawn at the same time. This is explained by the fact that the gases moved up the side walls and did not penetrate the center which was relatively cool. Further, upon drawing, the stone in the center moved more rapidly than on the sides where frictional resistance is greater, aggravating the condition more.

3. Low production and high fuel consumption resulted, as would be expected from the conditions existing.

To eliminate the difficulties encountered with slagging due to the high temperatures carried, and the non-uniform product which resulted from lack of penetration, it was decided to dilute the gas with recirculated products of combustion and CO_2 gases generated.

The simplicity of this arrangement can be noted in the accompanying sketch. It was accomplished by punching an 8-inch hole in each of the two short kiln walls, and carrying the products by means of suitable sheet metal ductwork to the inlet of a 1,000 c.f.m. fan operating at 5 inches static pressure. Provision was made at the inlet of the blower for admission of primary air. This mixture was then delivered to six burners, three on each side and located above the built-in combustion chambers previously used for wood firing.

What is here referred to as "burners," could be more accurately described as mixing tunnels. These consist of 7-foot 6-inch by 7-foot 6-inch openings punched in the 4-foot thick kiln wall, which are lined with firebrick. A steel box is inserted into these openings for the reception of recirculated products and gas fuel. These are intimately mixed in traveling through the 4-foot tunnel into the kiln. Since only about 10 per cent of the air for combustion is taken in at the blower inlet in the form of primary air, the burning of the gas is delayed until it meets the secondary air in the kiln proper. In fact it is very important that no combustion takes place in the tunnels and that the mixture be blown away from the side walls to the center of the kiln if slagging of refractories is to be kept at a minimum. The ratio of products of combustion to gas was normally kept about 6:1 although ratios as high as 10:1 were also used when lower hot zone temperatures were desired. The flame produced is bluish purple, transparent, long and bushy. Flame temperatures were reduced below the point where slagging takes place and the shaft of the kiln was filled out so that the gases penetrated to the center. Incidentally, the system is more flexible now because temperatures can be changed at any burner location or on either side by simply varying the quantity of products delivered at these points.

In order to eliminate the excessive slippage of stone in the center and to supply desired additional heat at this point, it was suggested by V. J. Azbe, consulting engineer, that an arch be sprung across the longitudinal axis of the kiln at the burner level. A 4½-inch square tunnel was provided below the top course of the tile into which a 4-inch pipe was inserted which served to carry gas to two diametrically opposed openings in the

MUELLER GAS DISTRIBUTION EQUIPMENT

The time-tested Mueller line includes Mueller Evenflow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

MUELLER CO., Decatur, Ill.

Factories: Decatur, Ill.; Chattanooga, Tenn., Los Angeles, Calif.; Sarnia, Ont.
Branches: New York and San Francisco.

Nemec burners and controls are used all over the world for the largest as well as the smallest power plants.

NEMEC COMBUSTION ENGINEERS, WHITTIER, CALIFORNIA

REFRACTORIES

GENERAL CERAMICS COMPANY

• REFRACTORIES •

For Conversion Burners, Circulating Heaters, etc.

Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.

General Ceramics Company, 30 Rockefeller Plaza, New York

center where it was burned. This arch was effective in eliminating the drawing of incompletely burned lime from the center of the kiln.

The changes so far mentioned unquestionably raised the efficiency of the kiln materially, because of the more uniform heat distribution. In an effort to carry this item still further, about 90 per cent of the combustion air was taken in through the cooler and was preheated by the burnt lime thereby recuperating about 10 per cent of the total heat required for its burning.

Since practically all of the combustion air was induced by natural draft, lack of some kind of control over the draft was serious from the standpoint of the admission of excess air. To overcome this objection, the kiln top was inclosed with the exception of two openings which were covered with steel plates that could be raised to any position to charge the kiln or control the draft.

A further advantage of draft control lies in the fact that as the draft increases the tendency of the flue gases to travel up the side walls becomes more pronounced and the possibility of stratification of the air and gases becomes more likely.

In view of what was mentioned earlier in the discussion with reference to rapid CO_2 removal, it is apparent that the control of the draft is the crux of efficient kiln operation. Unfortunately, it is the most difficult thing to control on a natural draft kiln since it is affected by many variables such as atmospheric conditions, the size of stone charged, the height of the kiln, the quantity of fuel burned, and the filling up of the interstices between the lumps of lime occasioned by the crushing action caused by impact when the kiln is "brought down." These difficulties no doubt can be overcome to a great extent by the installation of an induced draft fan.

The draft to be used will vary with different kilns and should be held at the lowest point possible. A method of determining this value is by means of a flue gas analysis, and as in boiler practice, the maximum CO_2 obtainable with the absence of CO is the governing factor. In our experience a draft of .02 inch to .03 inch was found to be most effective and resulted in an analysis of approximately 30 per cent CO_2 and 3 per cent O_2. The gas consumption was 5,000,000 B.t.u. average per ton of dolomitic limestone. At high rates of production it dropped down as low as 4,500,000 B.t.u.

The effect of the changes was most pronounced and gratifying. A more uniform and better product resulted from the efficient heat application. Production was doubled due to the more effective heat distribution and lengthening of the heating zone which resulted from delayed combustion. Slagging of refractories was reduced materially and the fuel consumption was decreased about 30 per cent. And so it can be said also of the oldest industrial heating operation that it too can be done "better with gas".

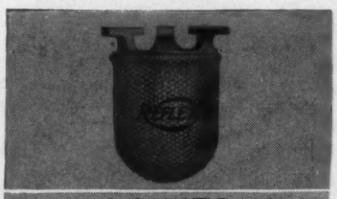
Columbia System Campaign Nets 1,386,860,000 cu. ft. New Load

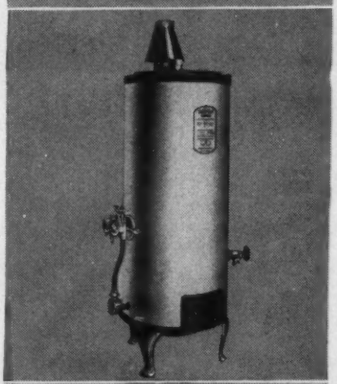
COLUMBIA System's first house heating contest, running 18 weeks, was concluded November 16 with 1,386,860,000 cu. ft. of new load, according to B. H. Gardner, director of sales of the Columbia System. This figure represents 135 per cent of the quota set for the campaign. A total of 21,230 heating units of various types were sold, bringing the average for the system of new house heating load per customer for the year 1935 to 1,470 cu. ft.

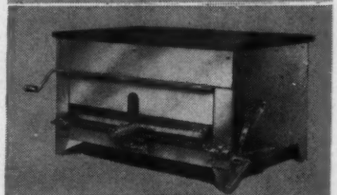
As reported in the September issue of *Western Gas*, the distributing territories were divided into two classes for contest purposes—Division A, territories with less than 50,000 meters, and Division B, territories with more than 50,000 meters. First prize for Division A, consisting of the P. G. Gossler Trophy (a silver cup) and $200 cash award went to the Indiana group; first prize for Division B, Gossler Trophy and $600 cash award, was won by the Cincinnati group. Second and third prizes were won by the Virginia and Binghamton, and the Columbus and Pittsburgh groups, respectively. Individual salesmen were awarded 13 prizes ranging from $200 to $10. In addition, five salesmen having the highest standing for the period from July 19 to September 28 won trips to the A.G.A. Convention, October 14 to 17.

New Office at Crockett, Texas

United Gas Public Service Co., headquartering in Houston, Texas, held a formal opening early in December of its new district office at Crockett, Texas.


GAS MANTLE


HOTZONE GAS WATER HEATER


HOTZONE BROILER-GRIDDLE

RELIABILITY

. . . is *earned*

NOT ANNOUNCED

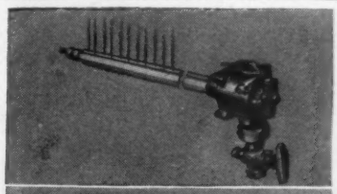
WELSBACH'S pioneering work developed the gas mantle, the HOTZONE gas water heater with its recognized high efficiency, the Radiant Broiler Burner, with its penetrating Infra Red Ray for cooking, and the luminous flame gas furnace burner with its silent heat for the home. Behind all these products stands Welsbach's well-earned reputation for reliable appliances produced with the technique which only a half-century old experience can provide.

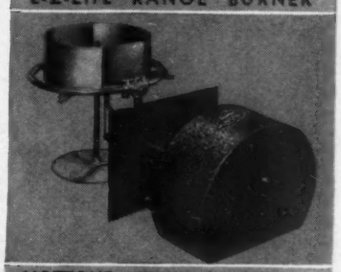
Welsbach Company

Gloucester City, N. J.

Branches in Chicago and San Francisco

Since 1887, Pioneers in the Manufacture of Gas Burning Appliances


E-Z-LITE RANGE BURNER


HOTZONE FURNACE BURNER

WRITE TODAY FOR CATALOGS PRICES AND DETAILS ABOUT WELSBACH PRODUCTS

Making a New Natural Gas Community Heat Conscious

(Continued from Page 17)

thrifty fuel. This symbol was used in all subsequent heating advertisements. In addition to describing the several classes of heating apparatus this series also stressed the ease with which they could be installed. No product was referred to by trade name, but each was described as a type of gas heating application especially adapted to certain conditions.

Beginning with August a third style of copy appeal varied the advertising. This August series was built around the economy of gas heating. Prominent in the ads were such headlines as "Cigarette Money," "Get Your Hair Cut With What You Save on Gas Heat," "Chicken Feed," "Get Shoes Shined"—all pointing to directions in which gas savings might be used.

But little response greeted the gas company's barrage of advertising, in the early stages, but those in charge of the campaign had faith in its cumulative effect and the effort continued. Then in the latter part of July results started to show. About this time dealers began to see possibilities in the gas heating market; a number of oil burner dealers switched to gas, due in part to interest generated by the advertising.

Dealers and company combined sold 425 major heating installations (mostly central furnaces and conversion burners, with a few circulators) before the September 1 close of the campaign—and this on a system with only 10,000 gas meters. Number of heating customers was practically doubled by the three-month sales drive.

Term financing of heating equipment sales during the campaign took advantage of the F. H. A. facilities, with 10 per cent down and nine to 18 months on the unpaid balance, dealers using the identical terms offered by the gas company.

There are already 40 dealers in gas heating equipment in the Phoenix area, whereas there was virtually none before the advent of natural gas. An important phase of the company's program for making Phoenix "gas heat conscious" has been its work with dealers, the cooperation taking several forms.

Installation business has been turned entirely to commercial heating contractors, including installation of jobs sold by company representatives. Along with this policy the company has insisted upon a high standard of installation work. A training course for dealer salesmen and installation men was conducted, subject matter being developed by the company's industrial sales department engineers. Figuring heating requirements for individual jobs, placement of equipment, estimating costs, etc., were covered in this course, which was conducted in consecutive evening sessions of two to three hours each, the course running about a week for each group.

The compensation plan for company salesmen also has a bearing upon dealer sales. It is a combination of straight salary and flat bonus, the latter varying with type and capacity of the appliance sold and being given both on dealer and company sales, if the salesman's worksheets show the purchaser's name.

Perhaps the most effective cooperation available to dealers is the advertising bonus offered by the gas company on gas heating equipment sales. This bonus is the means of securing accurate reports of dealer sales and installation work, as well as serving to build up the amount of advertising carried. Dealers report their sale on suitable forms each month, and credit toward future advertising is built up on the gas company boooks. No cash is paid out on this plan. Advertising is run by the dealers and paid for by the company at its own rates. The credit is built up on a flat bonus schedule ranging from $1.50 to $5.00 per appliance sold, depending on the type and capacity.

Report forms call for name and address of purchaser, date of installation, equipment description, etc. Company inspectors spot-check the installations to make sure that they conform to standards of workmanship and materials required to make the sale qualify for the advertising bonus.

This flat advertising bonus on sales applies only to heating equipment. In addition, however, the gas company offers to share one-third in the cost of independent advertising done by dealers on house heating or water heating equipment. To secure this the dealer must meet a set of standards for type of copy, media to be used, etc.

Among the promotional material created for use of house heating salesmen is a testimonial booklet, made up from the advertisements carried in the campaign series described earlier. Each advertisement was standard in size with the testimonial spotted at the top, and company signature and the standard campaign offer located at the bottom where it could easily be trimmed off to leave only the testimonial. Extra proofs were pulled of the advertisements and from them the booklets were prepared for dealer and company sales representatives.

Company sales of heating equipment are handled by a force of seven territorial salesmen, each with about 1,200 meters in his district. There is also a dealer coordinator and a dealer estimator who works under the coordinator. The estimator will figure any heating job for dealers without charge.

Although the summer campaign brought concentrated attention to house heating, and winter temperatures are now keeping the installation crews busy without special sales effort, the company is still holding the sub-

HYDRAUGER

MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.

HYDRAUGER CORPORATION, Ltd.
116 New Montgomery St.
San Francisco, Calif.

The Goodman Stopper

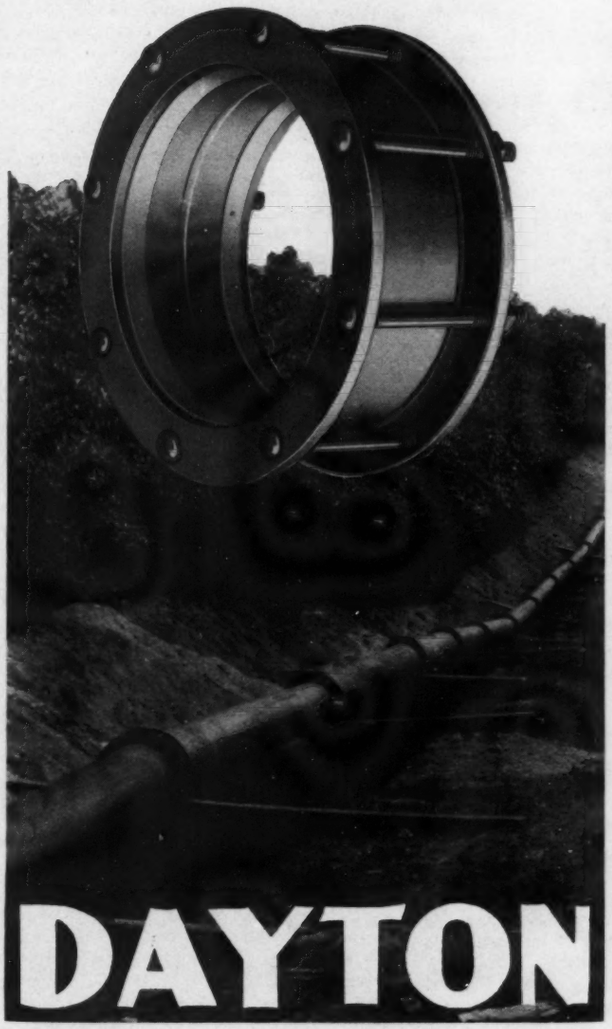
The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

The Big Name in
HEATING
and **AIR CONDITIONING**
is
MUELLER-MILWAUKEE

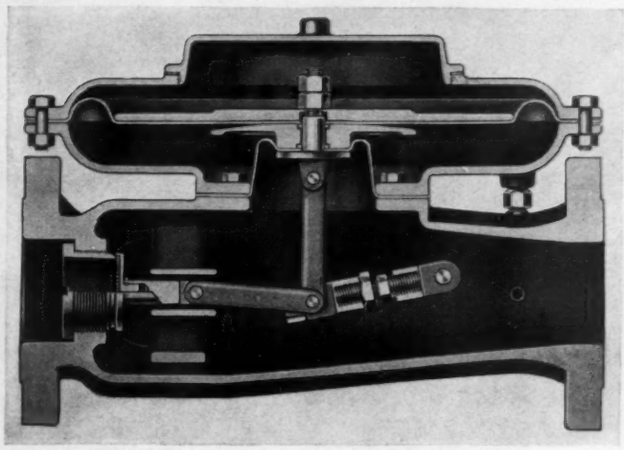


Regardless of the service requirement—original installation or repair of pipe or joint—wherever pipe is to be joined in a strong, flexible, permanently tight connection, there is a Dayton product that will do the job rapidly, efficiently and economically. The use of Dayton Couplings on lines of either manufactured or natural gas assures dependable, leak-proof joints as long as the line is in use and full salvage value at replacement.

Made in all sizes, for every pipe line need.

THE NATIONAL-SUPERIOR CO.
DAYTON PIPE COUPLING DIVISION
DAYTON, OHIO

Performance

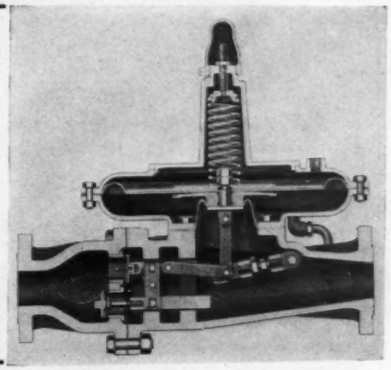


REYNOLDS Toggle Type Regulators for industrial Gas Control, proved by performance in actual operation, guarantee smooth, constant outlet pressure and volume even though inlet pressure and volume are decidedly jumpy. Some of their outstanding features are: Removable Valve Pocket and Orifices; Side Hand Holes; Streamlining that directs the flow of Gas, increasing capacity and range; pressure reduction* from pounds to pounds and pounds to inches W. C.; single or double valve construction; spring or dead weight type adjustment and equipped with or without pilot control.

*Body of Regulator is so machined that a pounds to pounds diaphragm casing, or a pounds to inches W. C., diaphragm casing may be used or interchanged. Also equipped with removable inlet spool with orifices which permits installation of various sizes of orifices while Regulator is in pipe line.

ABOVE—
Cross-section view—
REYNOLDS
Dead Weight—
Single Balanced Valve,
Toggle Type Regulator

AT THE RIGHT—
Cross-Section
REYNOLDS NEW
Streamlined Regulator
which guarantees
greater capacity—
truer response—more
uniform performance



REYNOLDS BRANCH OFFICES: 421 Dwight Bldg., Kansas City, Mo.; 2nd Unit, Santa Fe Bldg., Dallas, Tex.
REPRESENTATIVES: Eastern Appliance Co., Boston, Mass.; F. E. Newberry, Avon, N. J.; G. H. Unkefer, 428 Boyd St., Los Angeles, Calif.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Plastic After 8 Years

Above illustration shows NO-OX-ID cut away from surface of a tank on which it had been applied 8 years previously. Lower illustration shows same NO-OX-ID after being smoothed back in place with knife blade. NO-OX-ID gives long time protection.

DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant St., Phone SUtter 6888

NO-OX-ID
IRON-RUST
The Original Rust Preventive

MAKE YOUR
Chicago VISIT A
Real Pleasure

Stay where successful men and women stay-on Michigan Avenue at the Auditorium Hotel where the gallant hospitality of the past meets the modernity of today. Enjoy the fine food,—the large spacious rooms and the convenience of its "edge of the Loop" location.

AUDITORIUM HOTEL
MICHIGAN AVENUE AT CONGRESS STREET
GEO. H. MINK *Manager*

RATES
WITH PRIVATE BATH $2.50
WITHOUT PRIVATE BATH $1.50

ject of gas for heating before its public. A radio program is now on the air twice weekly in half-hour periods, featuring gas heat as a service, and alternating in promotion of different types of equipment. Circulating heaters got the play in October, with excellent results. This radio program takes the form of a mythical "Electrigas Night Club," using N. B. C. transcriptions with messages interspersed by local announcer.

Satisfied users represent the biggest single factor in quick conversion of Phoenix householders to gas heating, say gas company sales executives who did the job. Of course, they didn't become satisfied just by accident. Rigid installation standards helped; so did the fact that the company checked the initial heating bills against its advance estimates and anticipated complaints by servicing those installations where bills seemed out of line. It is of note in this connection that there has been not a single case of repossession on account of high bills.

While the account above has dealt largely with house heating results in Phoenix, it might be duplicated in great part for commercial heating, for in this classification, too, Phoenix has adopted the ideal fuel almost 100 per cent.

Sales Jump 37 Per Cent in P. G. and E. Territory

GAS appliance sales for 1935 in the territory of the Pacific Gas and Electric Co. in Northern California, totaled 94,260 units, representing nearly $7,000,000 in retail merchandise value. This is an increase of 37 per cent over 1934 and is the best showing since 1931, the year natural gas was introduced on the P. G. and E. system. The accompanying table gives comparative results for 1935 and 1934.

Last year P. G. and E. expended approximately $145,000 in advertising gas service and appliances in the form of newspaper advertising, dealer bulletins, display cards, window displays and radio announcements. During specially designated sales campaigns the company supported dealer tie-in advertising in newspapers by paying one-third of the cost. Newspapers throughout the territory frequently carried full pages of gas appliance advertising.

Liberal financing through the Federal Housing Administration and through the company's own financing plan by the terms of which purchasers are allowed as long as 36 months to pay in $3 minimum monthly installments and no down payment, provided the principal impetus to sales.

Analysis of appliance sales results for 1935 reveals that in general merchandise of distinctly higher quality was marketed, the average price being about 10 per cent higher than in 1934. Improved appearance and automatic control proved a boon to range sales. The sales increase for automatic gas water heaters was considerably greater than that for the non-automatic type. Improved floor furnaces and circulating heaters showed an increase of 50 per cent over 1934. Conversion burner sales for circulators and stoves were nearly double. Sales in the basement furnace and gas boiler field showed a marked increase.

1936 Sales Plan

In its 1936 sales plan the P. G. and E. will follow that of 1935 quite closely. Work on the current year's program began last August, the plan was submitted to the company management in November, and had approval December 1. Working this far in advance made it possible to take details of the plan to the several company division organizations in December and thus maintain sales effort without the customary January lag while the new year's plan is awaiting approval.

Measured in terms of annual earning power of appliances sold, the 1936 sales quota calls for $681,000 from new commercial and industrial gas business and $1,138,905 from domestic gas business—both figures representing combined sales of company and dealers in P. G. and E. territory.

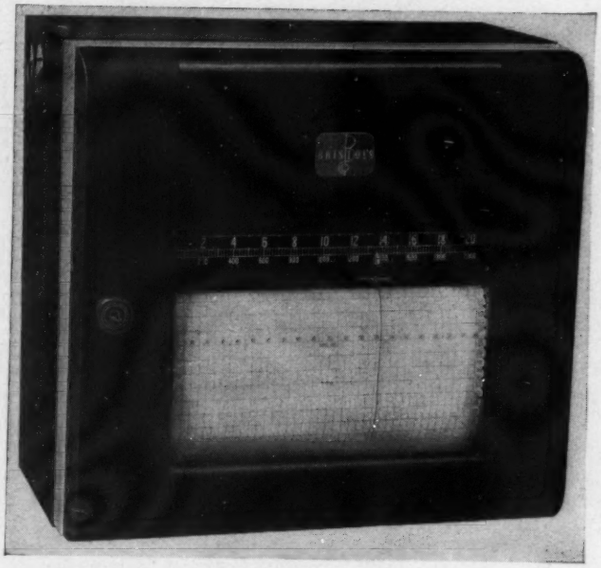
Gas heating will be stressed in 1936 sales promotion, $788,000 in new annual revenue being set up as sales bogy from central furnaces, circulators, floor furnaces and smaller space heating equipment.

In heating sales promotion the only change

SALES RESULTS IN TERRITORY OF PACIFIC GAS AND ELECTRIC CO. FOR 1934 AND 1935.

Appliance	1934 Number of Units Sold	1935 Number of Units Sold	1935 Average Unit Price	1935 Approximate Total Value
Domestic Ranges	28,018	37,617	$100	$3,761,700
Automatic Water Heaters	14,172	20,825	66	1,374,450
Non-Automatic Water Heaters	6,129	6,102	17	103,734
Gas Radiators	596	473	38	17,974
Radiant-type Heaters	2,033	2,211	18	39,798
Wall Heaters	660	1,826	38	69,388
Floor Furnaces	3,960	6,681	55	367,455
Circulating Heaters	6,974	8,779	33	289,707
Basement Furnaces	3,518	5,355	125	669,375
Gas Boilers	135	222	190	42,180
Conversion Burners	2,439	4,169	40	166,760
Total	68,634	94,260	.....	$6,902,521

Industry Acclaims this fine pyrometer



Built by the pioneer makers of Pyrometers, this latest Bristol's sets a new standard in potentiometer design and craftsmanship.

Only a few months or so have elapsed since this new Bristol's Wide-Strip Pyrometer was first announced at the Chicago National Metal Congress in October. Yet according to the ever-increasing number of enthusiastic reports that are coming in, it is the finest pyrometer ever presented to industry! Again Bristol design and craftsmanship have triumphed!

The use of a new principle in the balancing mechanism permits even the smallest deflections of the galvanometer to be measured and recorded. The pen responds promptly. Balance is quickly restored. Changing temperatures are speedily and accurately charted. Thanks to the elimination of back lash, lost motion, irregularities and the uncertainties unavoidable with friction wheels, ratchets and the like, this Bristol's sets a new standard in simplicity.

There are many features which merit careful appreciation. Besides the unusually wide strip chart, "far vision" indicating scale, heavy duty galvanometer, duplex slide wire, these are fully described in Catalog 1450 mailed on request. Write for a copy.

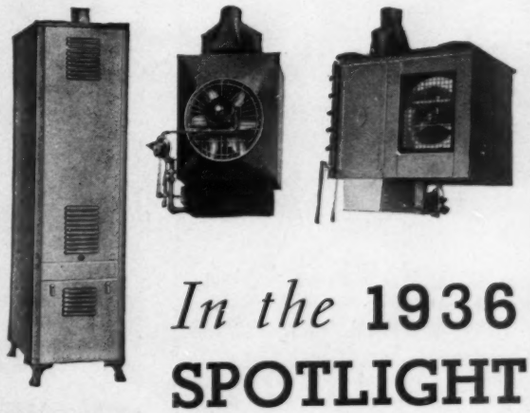
THE BRISTOL COMPANY

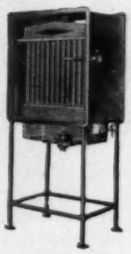
Branch Offices: Rialto Bldg., San Francisco
747 Warehouse Street, Los Angeles
Branch Factory: 311 Minna Street, San Francisco

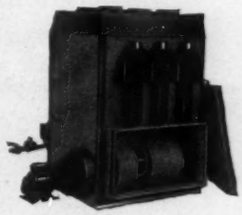
BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.

WIDE-STRIP PYROMETER







In the 1936 SPOTLIGHT

PACIFIC Popularity Now Exceeds All Previous Records

There are many distinct benefits to be gained by concentrating your sale on one major line . . . .

PACIFIC

1. **There is a Standardized PACIFIC Product for every modern gas heating need—its safety, efficiency and reliability proved in many actual installations.**
2. **Every PACIFIC appliance is a quality product, complying with National Safety Requirements and unconditionally guaranteed.**
3. **You get 100% direct cooperation from a Factory that has been in successful operation for nearly a quarter of a century.**

Send for Complete New Sales Literature TODAY!

Most Modern and Complete Gas Appliance Catalog Ever Offered the Gas Industry

Why divide your sales among several different makes, when ONE company offers you complete coverage of every residential, commercial and industrial heating need?

Your inquiries are invited

PACIFIC GAS RADIATOR CO.
Huntington Park, California, U. S. A.

GAS HEATING HEADQUARTERS

Winter is still ahead
and so are
FLOOR FURNACE
Sales

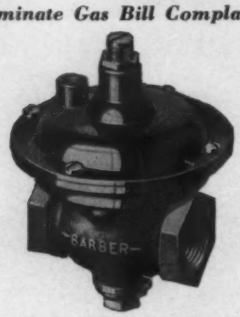
Plenty of people are struggling along with inferior heating equipment, not because they can't afford new appliances, but because they haven't been educated to the economy and healthfulness of WARD FLOOR FURNACES. Only WARD has the big three . . . Bilt-in Thermo-Control, Cradle Circulation, Automatic Pilot . . . that make "Controlled Winter Comfort" possible.

Your load is as good as the appliance you sell. When you sell WARD Floor Furnaces you sell the best.

For Facts about how you can increase your load with WARDS, write . . .

WARD HEATER CO.
1800 W. WASHINGTON
LOS ANGELES, CALIF.

BARBER
Gas Pressure
REGULATORS
Eliminate Gas Bill Complaints



Made in ¼", ⅜", ½", ¾" 1", 1¼", 1½" and 2" sizes.

INCREASING numbers of Gas Appliance Manufacturers, Gas Companies, Jobbers and Dealers have switched to Barber Regulators because of their exceedingly low pressure drop, compactness, bronze bodies, and precision of operation. Why not write today for complete literature, prices and discounts on the entire Barber line of Burners and Regulators?

The Barber Gas Burner Co.
3702-4 Superior Avenue
CLEVELAND - - - - - - - OHIO

of importance is the company's decision to renew its direct sales work on smaller circulating heaters. For the past several years it has sold only circulators of 45,000 B.t.u. hourly input or larger, leaving the smaller heater market to dealers. Decline in sales volume has prompted the company to reenter this market, and dealer endorsement for the step was secured earlier in the present heating season. Facts behind the P. G. and E.'s resumption of direct sales in this market will be given in next month's *Western Gas*.

From sale of domestic ranges and cookers in 1936 the company will seek $98,750 in new annual revenue, and $123,300 from water heating equipment, with emphasis upon automatic storage heaters. Direct sales work of the company will be confined on water heaters to replacing non-automatics, waterbacks, and competitive fuel appliances.

Manpower for company domestic sales work will consist of a force of 202, made up principally of 175 salesmen, 11 dealer salesmen, and 12 crew captains. The commercial, industrial and agricultural sales force will number 91.

In 1935 the P. G. and E.'s tie-in plan for encouraging purchase of appliances under F. H. A. terms was outstandingly successful, and sales promotion for the early part of 1936 will urge prospective purchasers to avail themselves of F. H. A. before its scheduled expiration in April. Long term financing, either under the company's own plan inaugurated several years ago, or under some F. H. A. continuation or substitute, will undoubtedly play a leading part in getting sales results this year.

New Liquid for Eliminating Leakage and Dust Troubles

ARBIDE and Carbon Chemicals Corp. last month announced the development of a special liquid for treatment of gas mains, sold under the name of Carboseal by Carbide and Carbon under a license from the United Gas Improvement Co. This liquid is designed for introduction into gas mains for the purpose of correcting leakage in packed bell and spigot joints, by moistening and swelling the jute packing; it also moistens and lays any corrosion products present in the mains that would otherwise cause dust troubles.

The physical properties of this liquid are low vapor pressure so as to prevent loss by evaporation into the gas stream, low viscosity so that it can travel upward around the interior of the gas main and into all portions of the packed joint, prevention of rust, penetration of hard tar deposits, attraction of water so as to maintain proper liquid state, and resistance to congealing or freezing at low temperatures.

Carboseal is introduced into the gas distribution system at high spots, so that it can travel along the bottom of the pipes and any surplus be withdrawn at drips. The pipe can either be tapped at the high point from a street excavation, or a riser can be attached to a service joining the main at the high point, and the liquid poured in through the riser and service connection. As the liquid travels down the pipe it also rises up around the internal periphery, and penetrates into all parts of the joints, so that complete wetting is obtained in from two to 25 days, depending on the size of the pipe and the amount of deposits that may be inside and that also require wetting. To wet a pipe interior of unknown condition the procedure would be to make periodic injections until liquid appeared in the corresponding drip; if no drip is obtained in a reasonable time a bad leak in the pipe is indicated, which in itself is valuable information.

The quantities required vary from 300 to 450 pounds per mile of 3-inch equivalent pipe, estimating 500 joints per mile. For other sizes the requirements would be approximately in proportion to the relative diameters. Obviously the internal condition of the pipe introduces a considerable variation. Carboseal weighs 9.25 pounds per gallon at 60° F.

Wittkower Joins Geo. D. Roper Corp. Dallas Office

L. D. WITTKOWER, formerly in charge of the Stargas and butane departments of the Dallas Gas Co., has joined the Dallas office of the Geo. D. Roper Corp. as sales representative. He will work with J. C. Mansfield, manager of the Dallas office.

L. D. WITTKOWER

Mr. Wittkower has long been associated with the gas industry in the Southwest, having started with the Texas Power & Light Co. as commercial manager in charge of natural gas sales and service in East Waco, Waco and Highland Park. He later became a salesman for Community Natural Gas Co., Greenville, Texas, then manager of that company's district which embraced Greenville, Bonham and Terrell, Texas, and Hugo and Durant, Oklahoma. Following this he re-entered the service of Texas Power & Light Co. as merchandise manager at Fort Worth, and held this post until his recent connection with Dallas Gas Co.

Central Arizona Light and Power Executive Changes

EDWARD H. COE, vice-president and general manager of the Central Arizona Light and Power Co., Phoenix, since 1925, was elected president of the company on December 31, 1935. Mr. Coe succeeds Howard L. Aller, who was recently elected president of the American Power and Light Co.

A. F. Morairty, assistant general manager, was elected vice-president. C. A. Hulse and Frank E. Mell continue respectively as secretary and treasurer, and as assistant secretary and treasurer.

The recently elected directors of Central Arizona Light and Power are Mr. Coe, Fred J. Joyce, Mr. Morairty, Walter Roche and Frank B. Schwentker.

Australian Gas Service

(Continued from Page 13)

with what is being done in the United States and Great Britain.

Two publications of the C.G.A. which are edited by the writer are "The Service Messenger," circulating to our several properties, and "Gas News", a small monthly which goes out to gas customers in our various districts. This has been generalized in tone to meet the differing conditions I have mentioned earlier. It brings to our customers information on modern gas appliances, new recipes, and other home helps which relate to gas service.

The somnolent self-satisfaction that has stamped the industry in the past is being removed, and under the stimulus of competition, the public is learning not only new facts about the gas industry in Australia, but is developing a higher appreciation of what gas means in domestic comfort and convenience.

Architects and builders realize that modern gas appliances are better than older models, and the ordinary man in the street remarks the new "liveness" of gas. Though we are apt, like our English cousins in the gas industry, to look inwards instead of outwards, I think it is generally recognized that gas purely as a heating medium, has a tremendous future before it. The danger lies in believing that everything that electricty does can also be done with gas, as for example, says someone in England, "Why not a gas-driven radio?" Defend us from the gadget, beloved of the electrician, and the inward vision of the diehard in the gas industry, and we should make definite forward movement. And after five very lean years, all Australian gas companies report increased sales, not entirely as a result of a return to prosperity, but rather as a direct result of getting out and scratching for the business that was always there if they had only known how it was to be secured.

Branche, New Bryant Engineering Chief

The Bryant Heater Co., Cleveland, announces the appointment of N. T. Branche, formerly chief engineer with Surface Combustion Corp., as chief of its engineering staff. The company has also added seven other new men to its engineering personnel while retaining the previous force in its entirety. Mr. Branche's duties will consist of managing and coordinating the activities of the company's divisional engineers in the application of design worked out by Ernest Szekely, director of creative development.

Gas Heater for Rail Switches

The Long Island Railroad is keeping its switches in the Jamaica yards free of snow and ice this winter with gas-fired heaters. Altogether 1,528 heaters have been purchased for the purpose, which have a total consumption of 65,000 cu. ft. per hour.

S. M. Apperson Transferred to Austin

S. M. Apperson, Texas Public Service Co. sales supervisor at San Angelo, has been transferred to Austin, Texas, as commercial manager. C. O. Reed, of San Angelo, succeeds to Mr. Apperson's former post.

★

WEDGEWOOD

Extends

Best Wishes for a

HAPPY

and

PROSPEROUS

NEW YEAR

JAMES GRAHAM MANUFACTURING CO.

San Francisco • Newark • Los Angeles, Calif. • Portland, Oregon

PORCELAIN ENAMEL INSTITUTE, INC.

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Please send me, absolutely free, a copy of your new, easy-reading, profusely illustrated sales manual on Porcelain Enamel.

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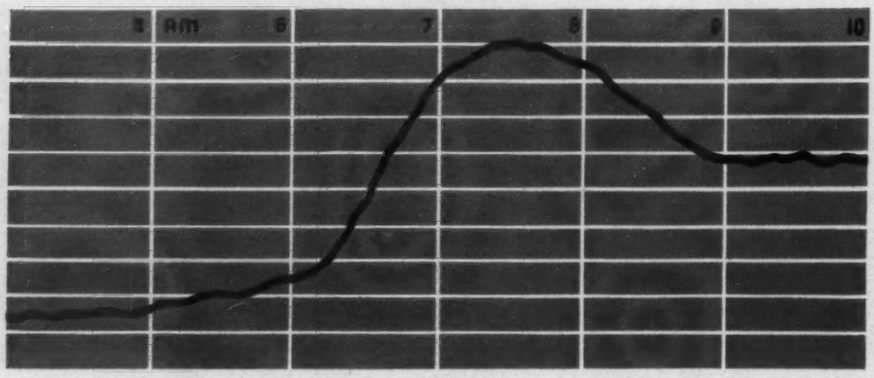
BLAW·KNOX GAS CLEANERS PROTECT THAT RISING LOAD CURVE



NO DUST STORMS CAN GET THROUGH TO THE COMPRESSORS

Blaw-Knox Gas Cleaners assure continuous compressor operation as the dust, sand, rust and scale entrained in the gas are entirely removed before the gas reaches the compression units.

These gas cleaners are made in standard sizes to suit most conditions and are specially designed for unusual operation. Write, giving maximum volume and maximum and minimum pressures and we will send you a preliminary estimate of cost.

A small investment in Blaw-Knox Gas Cleaners protects expensive equipment.

BLAW-KNOX GAS CLEANERS

BLAW·KNOX COMPANY

2033 FARMERS BANK BUILDING PITTSBURGH, PENNSYLVANIA

Spencer Thermostat Announces New Pressure Control

SPENCER Thermostat Co., Attleboro, Mass., announces its new snap-acting Klixon, Type PS, pressure switch, for automatic pressure limiting control in steam-heating boilers. The new control is made of bronze with a pressed steel case and removable cover which are finished in brown enamel.

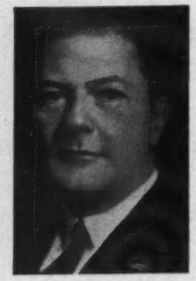
The Klixon Type PS pressure switch operates by pressure exerted on the corrosion resisting bellows which transmits motion directly to the snap-acting disc eliminating the necessity for a complex mechanism. Adjustments for both cut-in and differential settings are independent so that neither is affected by the other. Both adjustments are enclosed to prevent accidental change or tampering and are accessible by removing the cover. The electrical terminals are provided with insulating caps.

The switches are available in either two- or three-wire types to accommodate both low or normal voltages.

Creager Elected President Houston Company

R. B. Creager, receiver for the Houston (Texas) Gas and Fuel Co., following closing of the receivership November 25, was elected president of the company. K. L. Simons, general manager during receivership, was elected vice-president and general manager.

G. E. GOBLE



W. F. McCONNOR

National Tube Co. Advances Goble and McConnor

TWO executive advancements are announced by the National Tube Co., Pittsburgh, Pa., to be effective January 1, 1936. J. E. Goble, formerly manager of the export division of Oil Well Supply Co., New York, has been appointed vice-president in charge of sales for National Tube. W. F. McConnor, assistant general manager of sales of the National Tube Co., has been appointed general manager of sales.

Ducommon Corp. to be Known As Ducommon Metals & Supply Co.

DUCOMMUN CORP., Los Angeles, announces that upon January 2 its name will be changed to Ducommon Metals & Supply Co., in order that the firm's name may be more descriptive of its merchandise and to embrace recently added lines. There will be no changes in management or personnel.

The Ducommon Corp. was founded in 1849 in Los Angeles in a one story building. At present it occupies four warehouses in Los Angeles, a pipe storage yard in Wilmington, Calif., and recent additions to its warehouse facilities in San Francisco when completed will represent an investment of $200,000. After the first of the year a complete stock of general supplies will be added to the lines carried in San Francisco.

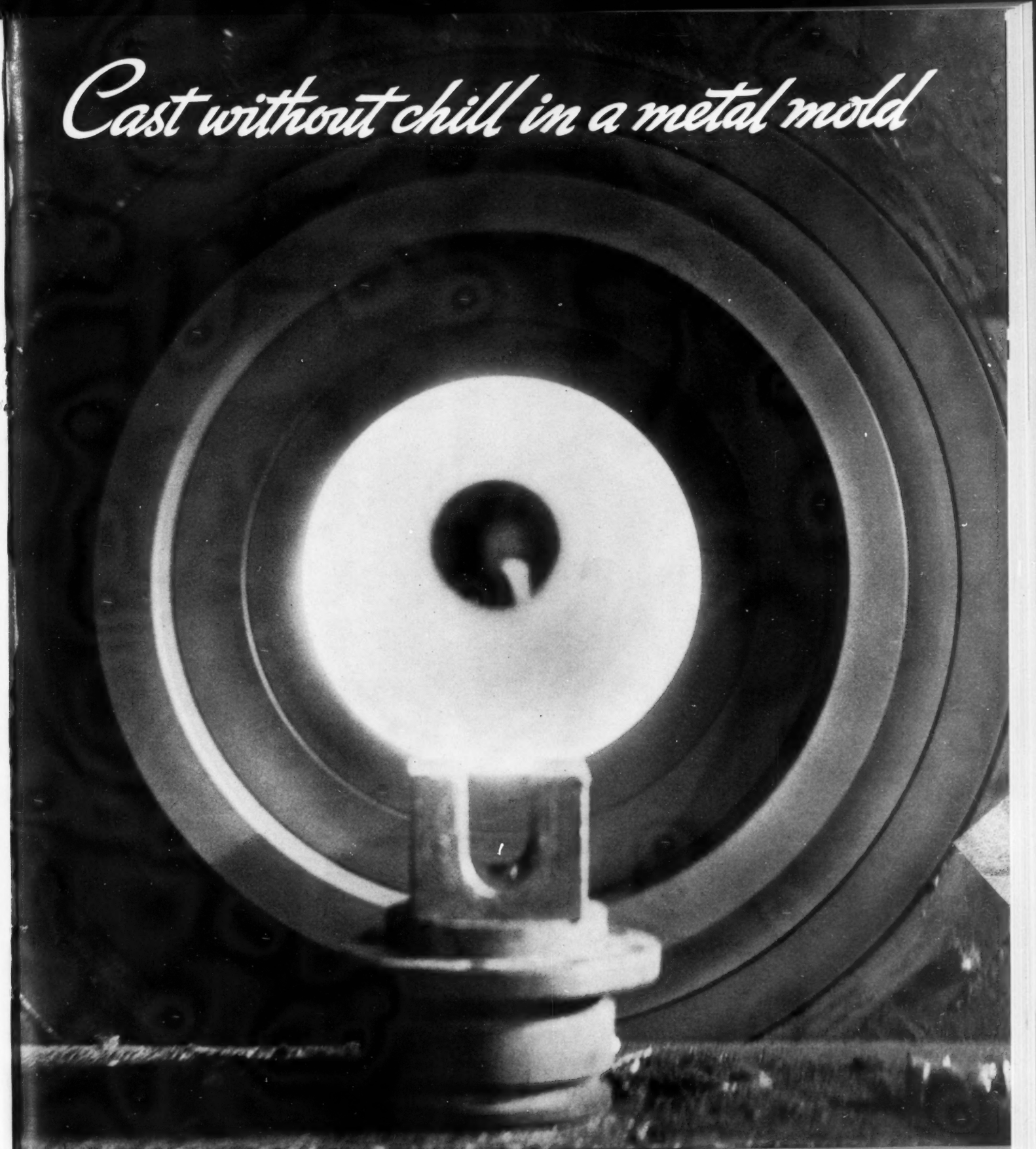
P. U. A. A. to Inaugurate Advertising Exchange Service

The Public Utilities Advertising Association early in 1936 will inaugurate an exchange service that will provide members with a portfolio of current utility advertising material from various parts of the country each month. The following committee, appointed by J. R. Pershall, president of the association, is charged with launching and operating the new service: E. Frank Gardiner, Commonwealth Edison Co., chairman; William Hodge, Byllesby Engineering and Management Corp.; H. O. Crews, Chicago Surface Lines; and Clayton G. Cassidy, the Peoples Gas Light and Coke Co. All the committee members are Chicagoans.

J. C. Reid Joins Southern Union

James C. Reid, formerly general manager of the Willmut Gas and Oil Co. at Hattiesburg, Miss., recently joined the staff of the Southern Union Gas Co. as operating manager in New Mexico.

Cast without chill in a metal mold



U.S. SUPER-de LAVAUD PIPE

CAST WITHOUT CHILL IN A METAL MOLD

UNITED STATES PIPE AND FOUNDRY CO., General Office: BURLINGTON, N. J.

Foundries and Sales Offices throughout the United States

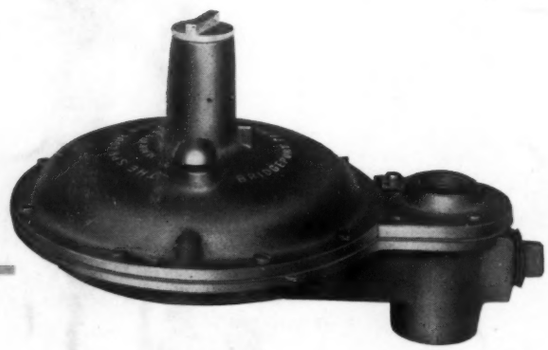
REDUCE OPERATING COSTS

with

SPRAGUE METERS

AND

SPRAGUE REGULATORS



THE SPRAGUE METER COMPANY
BRIDGEPORT CONNECTICUT